COMPUTER SCIENCE (THEORY)

STD. XII **MARKS: 70**

Note: Attempt all questions. Answers should be to the point.

Q.1 a) What is a Reference variable? What is its use? **2**

b) Name the header files to which the following functions belong: **2**

(i) puts( ) (ii) ceill( ) (iii) getline( ) (iv) read( )

c) Identify the errors with the following code: **2**

```
void large ( int & a, int & b);
        void main( )
        { large (5, 7);
         }

        void large ( int & a, int & b)
        { if a> b)
                a=-1;
        else
                b=-1;
        }
```

d) Give the output of the following program segment: **3**

```
# include <iostream.h>
int a=3;
void demo (int & x, int y, int * z)
{ a+=x;
  y*=a;
  *z=a+y;
  cout<<a<<" "<<x<<" "<<y<<" "<<z<<endl;
 }
void main( )
{       int a=2;
        int b=5;
        demo(::a,a,&b);
        cout<<::a<<"  "<<a<<"  "<<b;
}
```

e) What is the purpose of the function prototype? Give the output of the following: **2**

```
# include <iostream.h>
int divide (int);
void main( )
{       int a = 20;
        int val = divide(500) = = 50;
        cout<<"\n"<<val;
}
        int divide( int a)
        {       return (a/10);
        }
```

f) Write a program to print the truth table for XY + Z; **4**

Q.2 a) What do you mean by overloading a function? What is the importance of function overloading? **2**

b) Imagine a ticket-selling booth at a fair. People passing by are requested to purchase a ticket. A ticket is priced at Rs. 2.50/-. The booth keeps track of the number of people that have visited the booth, and the total amount of money collected. Model this ticket selling booth with a class tickbooth including following members:

Data Members: number of people visited, total amount of money collected.
Member functions:
I) To assign initial values (assign 0 to both data members).
II) To increase only Total no. of people in case ticket is not sold.
III) To increase Total no. of people as well as total amount if a ticket is sold.
IV) To display the two totals.
V) To display the number of tickets sold out.

Write a C++ program to run these functions. **4**

c)
```
class data;                    //forward declaration
        int x;
        class sample
        {       int x,y;
                protected:
                        int no;
                        char ch;
                        void processval( );
                public:
                        int cl;
                        char ab;
                        void putval( );
                        friend int check(sample, data);
        }
class data
{       int l;
        public:
                void getvalue( );
friend int check(sample, data);
        }
```

Which data members are accessible by the following functions: **2**
processval( ), putval( ), check( ), getvalue( )

d) What do you mean by static data members of a class? Explain the use of it. **2**

Q.3 a) What is the difference between dynamic and static allocation of memory? **2**

b) Write a C++ function to search for an element ITEM in a sorted single dimensional array A using binary search. Array contains only integer data. Function should return the location of the ITEM in the variable loc. If ITEM is not found then loc should be set to minus one (-1). **4**

c) Given a two dimensional array A[10][20], base address of A being100 and width of each element is 4 bytes. Find the location of A[8][15] when the array is stored column wise and also when the array is stored row wise. **3**

d) Evaluate the following postfix expression using a stack and show the contents of stack after execution of each operation: 50,40,+,18,14,-,4,*,+ **2**

e) Write a C++ function to delete an element from a queue housed in a linked implementation. Pointers FRONT and REAR mark the first and last nodes of the queue. **4**

Q.4 a) What is a stream? Name the streams generally used for file I/O? **1**

b) A file student.dat contains 4 data members: name, roll number, marks and grade, out of these, name and roll numbers have the values but marks and grade have been left blank. Write a C++ function, that reads the student records in objects of following class stu from the file student.dat: **4**

```
class stu       { int rollno;
                  char name[21];
                  float marks;
                  char grade;
                public:
                   stu( int i, char * s)
                    {   rollno=i;
                        strcpy(name,s);
                        marks=0.00;
                        grade=' ';
                        }
                void getmarks( )
                        {       cout<<"Enter marks: ";
                                cin>>marks;
                          }
                void calcgrade( )
                {       if (marks>=75)          grade = 'A';
                        else if (marks>=60) &&(marks<75) grade = 'B';
                        else if (marks>=50) && (marks<60) grade ='C';
                        else grade = 'D';
                }
        };
```

After reading the stu objects from the file, get students' marks from the user, calculate grade and then write all the data back into the same file.

Q.5 a) What is a relation? Differentiate between degree and cardinality. **2**

b) Write SQL commands for 1 to 6 and write outputs for SQL commands given in 7 on the basis of the following table STUDENT:

Table Student

No	Name	Paid	Stream	Marks	Class
1	Kushagra	T	Non Medical	90.6	12B
2	Bharti	T	Medical	92.0	12A
3	Ankit	F	Humanities	78.5	12C
4	Gaurav	T	Non Medical	93.5	12B
5	Aditi	T	Medical	93.2	12A
6	Rohini	F	Non Medical	73.5	12B
7	Namita	T	Humanities	63.5	11A
8	Avleen	F	Commerce	68.6	11C
9	Davneet	F	Commerce	75.4	12C
10	Aashima	T	Medical	89.2	12A

1. Select all the Medical stream students from the file. **1**

2. List the details of all those students who havn't paid their fees. **1**
3. List the names of all those students who are in Non Medical stream in class 12. **1**
4. Marks of a student "Avleen" has been by mistake entered as 68.6 instead of actual marks 86.6. Write a command to correct this mistake. **1**
5. Insert a new student in the file with values for all the columns. **1**
6. Count the total number of streams. **1**
7. Give the output of the following SQL commands: **2**
   i) SELECT MIN(Marks) FROM Student WHERE Marks<70.
   ii) SELECT COUNT (DISTINCT Stream) FROM Student.
   iii) SELECT Name, 'has paid' FROM Student WHERE Paid = 'T'.
   iv) SELECT MAX (Marks) FROM Student WHERE Stream = 'Medical'.

Q.6 a) State absorption law and prove one of them algebraically. **1**

b) Write AB+C in canonical sum of products form. **2**

c) Simplify the given expression: ABCD + ABCD + ABCD + ABCD. **2**

d) Reduce the following Boolean expression with the help of K-map. **2**

e) Draw a diagram for a 2 input decoder. **1**

f) Write the product of sums form for F(X,Y,Z) represented in the following Truth Table: **2**

X	Y	Z	F
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

Q.7 a) What are Repeaters and Routers? **2**

b) Define Hacking and Cracking. **2**

c) Define Mobile Communication. **1**

All the Best