1. (a) What is the Netiquette? (b) Why the computer literacy is so important? (10%)

2. (a) What is the purpose to transfer an analog system to a digital system? (b) What are the benefits of today's computer as a digital processing system? (10%)

3. (a) Show the computer's major functional blocks using the CPU, Memory, Data Bus and I/O as the major components. (b) What is the purpose of the functional division of above components? (10%)

4. (a) What is the Internet? (b) List and explain the functions of five major services of the Internet. (10%)

5. (a) List the memory and storage medium using in the computer system as many as possible. (b) Draw a diagram to show the memory hierarchy among all the memory and storage medium you listed above. (10%)

6. Given the alphabet and frequency table below (10%)

Alphabet	A	B	C	D	E	F	G	H
Frequency	50	26	38	36	40	15	20	18

   (a)　Construct the Huffman coding tree.

   (b)　How many bits does an alphabet require in average?

   (c)　Decode the binary string "110011001100111".

7. Consider the following recurrence equation. Please show that $T(n) = ?$ (5%)

$$T(n) = \begin{cases} k & n = 1 \\ 3T(n/2) + kn & n > 1 \end{cases}$$

8. For the following algorithm, give an analysis of the running time (in Big-Oh notation). (5%)

```
Algorithm sum(n)
{
    s := 0;
    for i:= 1 to n² do
        for j:= 1 to i do
            s := s + i;
}
```

9. Given a four dimensional integer array A(3, 4, 5, 6), and its data is stored sequentially starting from memory address A0F0:0100. Assume an integer occupies 4 bytes. (10%)

   (a) Find the address of element A(1, 2, 3, 4) for the row-major order and for the column-major order.

   (b) Why most of the computer languages use row-major order?

10. Given an undirected graph as following figure. (20%)
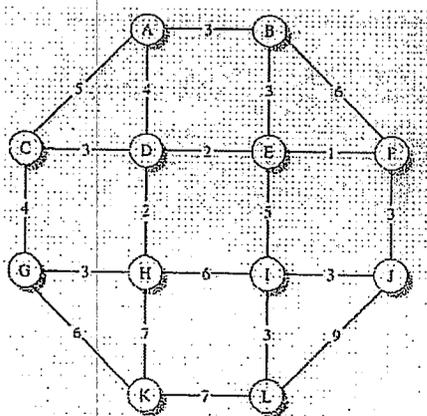
   (a) Apply *Dijkstra's* algorithm to find the shortest path starting at vertex A to other vertices. (5%)

   (b) Find all pairs shortest paths. (10%)

   (c) Construct the minimum spanning tree. (5%)