통신 시스템

기말고사

- 담 당 : 이 재 홍 교수
- 일 시 : 2008. 6. 14(토) 오후 2:45 – 오후 4:45+
- 책이나 노트를 볼 수 없음

1. (14 pts)
   a) Write what OFDM, MSK, OQPSK, SQPSK, and CPFSK stand for.
   b) Describe at least one advantage of OFDM.

2. (14 pts)
   a) Describe the role of an interleaver.
   b) Give the definition of the dual code of a linear.

3. (12 pts) Find the capacity of the channel shown in Figure 1.

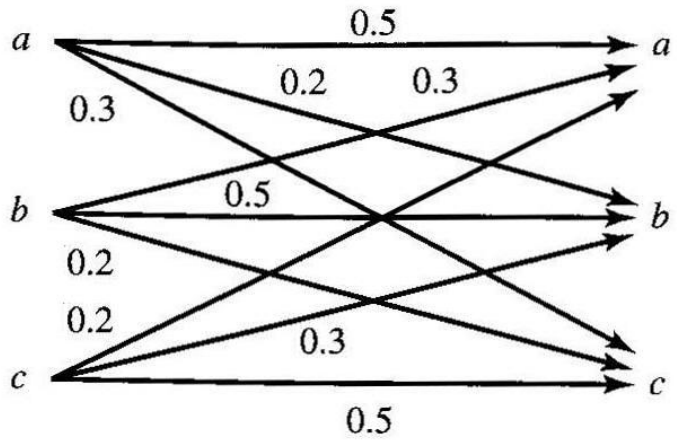

Figure 1

4. (12 pts) Prove that the minimum (Hamming) distance of a linear code is equal to the minimum weight of the code, that is,

$$d_{\min} = w_{\min}.$$

5. (12 pts) A code is defined by

$$C = \{00000, 10100, 01111, 11011\}.$$

Suppose that the mapping between the information sequences and codewords is given by

$$00 \to 00000$$
$$01 \to 01111$$
$$10 \to 10100$$
$$11 \to 11011.$$

a) Verify that this is a linear code, that is, an (n, k) linear code.
b) Find the values of n and k.
c) Find the generator matrix and the parity check matrix of the code.
d) Construct the standard array of the code.

6. (12 pts) The block diagram of the encoder for a binary (n, k) convolutional code is shown in Figure 2.

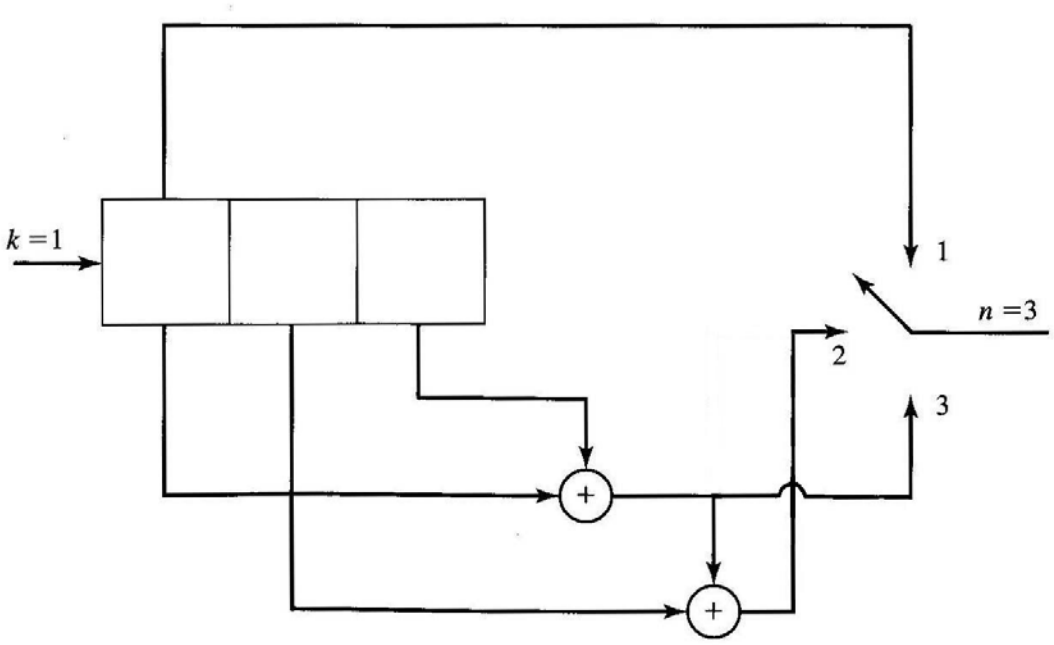

Figure 2

a) Find the values of n and k.
b) Draw the state diagram for the code.

7. (12 pts) Describe the differences of MSK, OQPSK, and QPSK and compare them with respect to their advantages.

8. (12 pts)
a) Give the definition of an m-sequence.
b) Give the definition of slow frequency-hopping spread-spectrum system.
c) Give the definition of the frequency reuse factor in a cellular system.