CHAPTER 5

Analog Transmission

Review Questions

1. Digital-to-analog modulation is the conversion of a digital signal into an analog signal.
3. Amplitude modulation is more susceptible to noise.
5. ASK, FSK, PSK, and QAM.
7. Modulation is the process of modification of one or more characteristics of a carrier signal by an analog signal that needs to be transmitted.
9. ASK: the bandwidth is almost equal to the baud rate.
11. PSK: the bandwidth is almost equal to the baud rate.
13. QAM: the bandwidth is almost equal to the baud rate.
15. PSK is based on phase shift and therefore is less susceptible to noise.
17. A modulator converts a digital signal into an analog signal using ASK, FSK, PSK or QAM. A demodulator converts an analog signal into a digital signal; it reverses the process of modulation.
19. Modems transform the digital output of computers into analog form usable by telephone local loops and vice versa.
21. AM is used for analog-to-analog conversion, ASK for digital-to-analog.
23. The bandwidth of an AM carrier signal is twice the bandwidth of the modulating signal, whereas the bandwidth of an FM signal is 10 times the bandwidth of the modulating signal.

Multiple-Choice Questions

25. c
27. b
29. d
31. c
33. c

35. b
37. b
39. a
41. b
43. c
45. b
47. a
49. d
51. a

Exercises

53.

a. 2000 bps
b. 4000 bps
c. 6000 bps
d. 3000 bps
e. 2000 bps
f. 2000 bps
g. 1500 bps
h. 6000 bps

55.

a. 1000 bps
b. 1000 bps
c. 3000 bps
d. 4000 bps

57.

a. $0.91 \times 127 = 116 \quad \Rightarrow 01110100$
b. $-0.25 \times 127 = -32 \quad \Rightarrow 10100000$
c. $0.56 \times 127 = 71 \quad \Rightarrow 01000111$

59. It is ASK (2 amplitudes, 1 phase) with 1 bit per baud. See Figure 5.1
61. It is PSK (1 amplitude, 2 phases) with 1 bit per baud. See Figure 5.2
63. ASK
65. QAM
67. No, 12 is not a power of 2.
69. Number of points = 2^n where n is the number of bits represented by a point
71.

a. BW = $4 \times 2 = 8$ KHz
b. BW = $8 \times 2 = 16$ KHz
c. BW = $(3{,}000 - 2{,}000) \times 2 = 2{,}000$ Hz = 2 KHz

Figure 5.1 *Exercise 59*

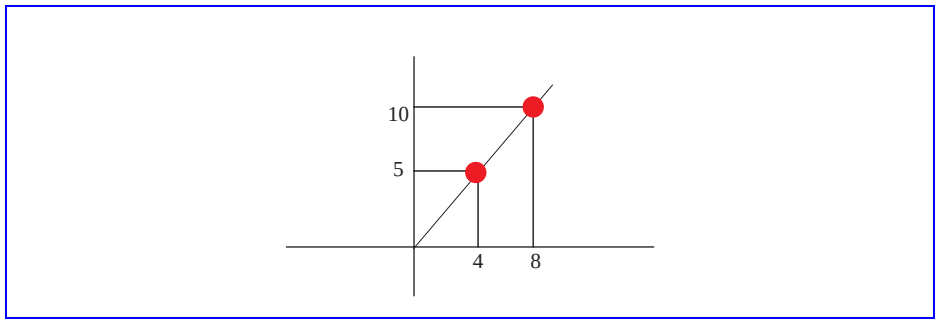

Figure 5.2 *Exercise 61*