سوال 18)

(a

$$SNR = 6\left(\frac{R}{2W}\right) - 7.2 = 6\left(\frac{28.8 \times 10^3}{2\,(8 \times 10^3)}\right) - 7.27 = 3.53$$

(b

$$SNR = 6\left(\frac{R}{2W}\right) - 7.2 = 6\left(\frac{64 \times 10^3}{2\,(8 \times 10^3)}\right) - 7.27 = 16.73$$

(c

$$SNR = 6\left(\frac{R}{2W}\right) - 7.2 = 6\left(\frac{R}{2\,(8 \times 10^3)}\right) - 7.27 = 40 \rightarrow R \cong 126\ kbps$$

سوال 19)

$$SNR = 6\left(\frac{R}{2W}\right) - 7.2 = 6\left(\frac{R}{2\,(4 \times 10^6)}\right) - 7.27 = 60 \rightarrow R \cong 90\ Mbps$$

سوال 20)

$$\left(\frac{44 \times 10^3 \times 16 \times 20}{8 \times 2^{10}}\right) \cong 1.71\ MB$$

سوال 27)

$$Nyquist \rightarrow f = 2W_s$$

$$(2\,(10 \times 10^3)) \times (\log_2 16) \cong 80\ kbps$$

سوال 29)

$$C = W\ \log_2(1 + SNR)$$

(a

$$C = 2400\ \log_2(1 + 100) = 15975\ bps$$

(b

$$C = 2400\ \log_2(1 + 10000) = 31890\ bps$$

(c

$$C = 3000\ \log_2(1 + 100) = 19974\ bps$$

(d

$$C = 3000\ \log_2(1 + 10000) = 39863\ bps$$

سوال 30)

$$C = 3000\ \log_2(1 + SNR) > 64000 \rightarrow SNR \cong 2.64 \times 10^6$$