6.2-5: The number of signals is 10. The bandwidth of each signal is $B = 100\,Hz$.

The Nyquist rate $R_{Nyquist} = 200$ samples/s (one signal).
The actual rate is
$$R_a \geq 400 \text{ samples/s} \quad \text{(one signal)}$$
For 10 signals, the actual rate is
$$R_{a10} \geq 4000 \text{ samples/s}.$$

$$\frac{\Delta v}{2} \leq \frac{0.25}{100} m_p = \frac{1}{400} m_p$$

But $\Delta v = \frac{2m_p}{L}$, then $\frac{m_p}{L} \leq \frac{1}{400} m_p$ and
$L \geq 400$. Let $L = 512$, then $n = \log_2 L = 9$ bits/sample.

The bit rate for 10 signals is
$$R_{b10} \geq 36 \text{ k bits/s}$$
Therefore,
$$B_T(\min) \geq 18 \text{ kHz}.$$

6.2-6: For sinusoidal signal $m(t)$, we have $\widetilde{m^2(t)} = \frac{1}{2} m_p^2$. Hence, $\widetilde{m^2(t)}/m_p^2 = \frac{1}{2}$. $SNR = \frac{S_o}{N_o} = 47$ dB, therefore $\frac{S_o}{N_o} = 10^{47/10} = 50119$. However,
$S_o/N_o = 3L^2\, \widetilde{m^2(t)}/m_p^2 = \frac{3}{2}L^2 = 50119$. Solving for L, we obtain $L = 182.8$. Therefore, let $L = 256$ for integer n.
$$\frac{S_o}{N_o} = \frac{3}{2}L^2 = \frac{3}{2}\cdot 2^{16} \Longrightarrow SNR = 49.93 \text{ dB}.$$

6.2-8: $\mu = 100$ and $(SNR)_{min} = 45$ dB.

$$SNR = 45 \text{ dB} = 10^{45/10} = 31622.777$$
From equation (6.18), we have
$$\frac{S_o}{N_o} = 31622.777 = \frac{3L^2}{[\ln(101)]^2}$$

$\therefore$ $L = 473.83$ and we must take $L = 512$ which corresponds to $n = 9$ bits. For $L = 512$, we have