Problem 6.14

The transmission bandwidth is maintained at the value

$B_T = 3$ kHz

In using an 8-level PAM system, the signaling rate is raised to

$$\frac{1}{T} = (\log_2 8) \times \left(\frac{1}{T_b}\right), \qquad T_b = \text{bit duration}$$

$$= 3 \times 4.5$$

$$= 13.5 \text{ kilobits/s}$$

However, the symbol rate is maintained at 4.5×10^3 symbols/s. Hence, as in Problem 6.12,

(a) The roll-off factor remains at $\alpha = 1/3$.

(b) The excess bandwidth remains at $f_v = 0.75$ kHz.