

11. We use the conversion factors given in Appendix D and the definitions of the SI prefixes given in Table 1-2 (also listed on the inside front cover of the textbook). Here, “ns” represents the nanosecond unit, “ps” represents the picosecond unit, and so on.

(a) $1 \text{ m} = 3.281 \text{ ft}$ and $1 \text{ s} = 10^9 \text{ ns}$. Thus,

$$3.0 \times 10^8 \text{ m/s} = \left(\frac{3.0 \times 10^8 \text{ m}}{\text{s}} \right) \left(\frac{3.281 \text{ ft}}{\text{m}} \right) \left(\frac{\text{s}}{10^9 \text{ ns}} \right) = 0.98 \text{ ft/ns}.$$

(b) Using $1 \text{ m} = 10^3 \text{ mm}$ and $1 \text{ s} = 10^{12} \text{ ps}$, we find

$$\begin{aligned} 3.0 \times 10^8 \text{ m/s} &= \left(\frac{3.0 \times 10^8 \text{ m}}{\text{s}} \right) \left(\frac{10^3 \text{ mm}}{\text{m}} \right) \left(\frac{\text{s}}{10^{12} \text{ ps}} \right) \\ &= 0.30 \text{ mm/ps} . \end{aligned}$$