

Problem 27

The following lengths are given in meters. Use metric prefixes to rewrite them so the numerical value is bigger than one but less than 1000. For example, 7.9×10^{-2} m could be written either as 7.9 cm or 79 mm. (a) 7.59×10^7 m; (b) 0.0074 m; (c) 8.8×10^{-11} m; (d) 1.63×10^{13} m.

Solution

The prefixes and their meanings are listed in Figure 1.2 on page 17.

$$7.59 \times 10^7 \text{ m} = 7.59 \times 10^7 \cancel{\mu\text{m}} \times \frac{1 \text{ Mm}}{10^6 \cancel{\mu\text{m}}} = 7.59 \times 10^1 \text{ Mm} = 75.9 \text{ Mm}$$

$$0.0074 \text{ m} = 7.4 \times 10^{-3} \cancel{\mu\text{m}} \times \frac{10^3 \text{ mm}}{1 \cancel{\mu\text{m}}} = 7.4 \text{ mm}$$

$$8.8 \times 10^{-11} \text{ m} = 8.8 \times 10^{-11} \cancel{\mu\text{m}} \times \frac{10^{12} \text{ pm}}{1 \cancel{\mu\text{m}}} = 8.8 \times 10^1 \text{ pm} = 88 \text{ pm}$$

$$1.63 \times 10^{13} \text{ m} = 1.63 \times 10^{13} \cancel{\mu\text{m}} \times \frac{1 \text{ Tm}}{10^{12} \cancel{\mu\text{m}}} = 1.63 \times 10^1 \text{ Tm} = 16.3 \text{ Tm}$$