1. Express each of the following in SI base units using scientific notation:

a. 1 week \(\times\) \(\frac{7 \text{ days}}{\text{wk}}\times\frac{24 \text{ h}}{\text{day}}\times\frac{60 \text{ min}}{\text{h}}\times\frac{60 \text{ s}}{\text{min}} = 6.048 \times 10^5 \text{s}\)

b. 1.35 mm \(\times\) \(\frac{1 \text{ m}}{1000 \text{ mm}} = 1.35 \times 10^{-3} \text{m}\)

c. 15 miles \(\times\) \(\frac{5280 \text{ ft}}{\text{mi}}\times\frac{12 \text{ in}}{\text{ft}}\times\frac{2.54 \text{ cm}}{\text{in}}\times\frac{1 \text{ m}}{100 \text{ cm}} = 2.4 \times 10^4 \text{m}\)

d. 4.567 \(\mu\text{s}\) \(\times\) \(\frac{1 \text{ s}}{10^6 \mu\text{s}} = 4.567 \times 10^{-6} \text{s}\)

e. 6.45 mL \(\times\) \(\frac{1 \text{ L}}{10^3 \text{mL}} = 6.45 \times 10^{-3} \text{L}\)

f. 47 kg = 4.7 \times 10^2 \text{ kg}

2. The mass unit most commonly used for precious stones is the carat: 1 carat = 3.168 grains, and 1 gram = 15.4 grains. Find the total mass in kilograms (kg) of a ring that contains a 0.50 carat diamond and 7.00 grams of gold.

\[
m_{\text{ring}} = m_{\text{Au}} + m_{\text{diamond}}
\]

\[
m_{\text{diamond}} = 0.50 \text{ k} \times \frac{3.168 \text{ gr}}{1 \text{ k}} \times \frac{1 \text{ g}}{15.4 \text{ gr}} = 0.109 \text{ g}
\]

\[
m_{\text{ring}} = 7.00 \text{ g} + 0.109 \text{ g} = 7.11 \text{ g} = 0.00711 \text{ kg}
\]

3. What is the total mass in grams, expressed in scientific notation with the correct number of significant figures, of a solution containing 2.000 kg of water, 6.5 g of sodium chloride, and 47.546 g of sugar?

\[
m_{\text{total}} = 2000 \text{ g} + 6.5 \text{ g} + 47.546 \text{ g} = 2054 \text{ g}
\]