SI Unit Conversions

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

   a. 1 week $\times\dfrac{7\text{ day}}{\text{wk}}\times\dfrac{24\text{ h}}{\text{day}}\times\dfrac{60\text{ min}}{\text{h}}\times\dfrac{60\text{ s}}{\text{min}}=\boxed{6.048\times10^{5}\text{ s}}$

   b. 1.35 mm $\times\dfrac{1\text{ m}}{1000\text{ mm}}=\boxed{1.35\times10^{-3}\text{ m}}$

   c. 15 miles $\times\dfrac{5280\text{ ft}}{\text{mi}}\times\dfrac{12\text{ in}}{\text{ft}}\times\dfrac{2.54\text{ cm}}{\text{in}}\times\dfrac{1\text{ m}}{100\text{ cm}}=\boxed{2.4\times10^{4}\text{ m}}$

   d. 4.567 μs $\times\dfrac{1\text{ s}}{10^{6}\mu\text{s}}=\boxed{4.567\times10^{-6}\text{ s}}$

   e. 6.45 mL $\times\dfrac{1\text{ L}}{10^{3}\text{mL}}=\boxed{6.45\times10^{-3}\text{ L}}$

   f. 47 kg = 4.7 x 10^2 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?

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