61. (a) The rms current is

$$\begin{aligned} I_{\text{rms}} &= \frac{\mathcal{E}_{\text{rms}}}{Z} = \frac{\mathcal{E}_{\text{rms}}}{\sqrt{R^2 + (2\pi fL - 1/2\pi fC)^2}} \\ &= \frac{75.0\,\text{V}}{\sqrt{(15.0\,\Omega)^2 + \{2\pi(550\,\text{Hz})(25.0\,\text{mH}) - 1/[2\pi(550\,\text{Hz})(4.70\mu\text{F})]\}^2}} \\ &= 2.59\ \text{A}\ . \end{aligned}$$

(b) The various rms voltages are:

$$\begin{aligned} V_{ab} &= I_{\text{rms}}R = (2.59\,\text{A})(15.0\,\Omega) = 38.8\ \text{V} \\ V_{bc} &= I_{\text{rms}}X_C = \frac{I_{\text{rms}}}{2\pi fC} = \frac{2.59\,\text{A}}{2\pi(550\,\text{Hz})(4.70\,\mu\text{F})} = 159\ \text{V} \\ V_{cd} &= I_{\text{rms}}X_L = 2\pi I_{\text{rms}} fL = 2\pi(2.59\,\text{A})(550\,\text{Hz})(25.0\,\text{mH}) = 224\ \text{V} \\ V_{bd} &= |V_{bc} - V_{cd}| = |159.5\,\text{V} - 223.7\,\text{V}| = 64.2\ \text{V} \\ V_{ad} &= \sqrt{V_{ab}^2 + V_{bd}^2} = \sqrt{(38.8\,\text{V})^2 + (64.2\,\text{V})^2} = 75.0\ \text{V} \end{aligned}$$

(c) For L and C, the rate is zero since they do not dissipate energy. For R,

$$P_R = \frac{V_{ab}^2}{R} = \frac{(38.8\,\text{V})^2}{15.0\,\Omega} = 100\ \text{W}\ .$$