74. (a) Let $\omega t - \pi/4 = \pi/2$ to obtain $t = 3\pi/4\omega = 3\pi/[4(350\,\text{rad/s})] = 6.73 \times 10^{-3}\,\text{s}$.

(b) Let $\omega t + \pi/4 = \pi/2$ to obtain $t = \pi/4\omega = \pi/[4(350\,\text{rad/s})] = 2.24 \times 10^{-3}\,\text{s}$.

(c) Since i leads $\mathcal{E}$ in phase by $\pi/2$, the element must be a capacitor.

(d) We solve C from $X_C = (\omega C)^{-1} = \mathcal{E}_m/I$:

$$C = \frac{I}{\mathcal{E}_m \omega} = \frac{6.20 \times 10^{-3}\,\text{A}}{(30.0\,\text{V})(350\,\text{rad/s})} = 5.90 \times 10^{-5}\ \text{F}\ .$$