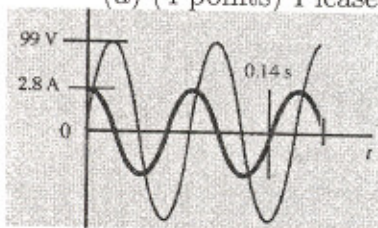


(3) The graph shows the voltage across and the current through a single circuit element connected to an AC generator.

(a) (4 points) Please determine the frequency of the generator.



$$\frac{3}{4} T = 0.14 \text{ s}$$

$$T = 0.08 \text{ s}$$

$$f = 12.5 \text{ Hz}$$

(b) (4 points) Please determine the rms voltage across this element.

$$V_{\text{RMS}} = \frac{V}{\sqrt{2}} = \frac{99}{\sqrt{2}} = 70 \text{ V}$$

(c) (4 points) Please determine the rms current through this element.

$$I_{\text{RMS}} = \frac{I}{\sqrt{2}} = \frac{2.8}{\sqrt{2}} \approx 2 \text{ A} \quad (1.97 \text{ A})$$

(d) (4 points) What is the reactance of this element?

$$X = \frac{V_{\text{RMS}}}{I_{\text{RMS}}} = 35 \Omega$$

(e) (4 points) Identify the circuit element. Specify the value of the capacitance if it is a capacitor, the value of the inductance, if it is an inductor, or the value of the resistance if it is a resistor.

Capacitor (current leads the voltage)

$$X_c = \frac{1}{2\pi f C} \Rightarrow C = \frac{1}{2\pi f X_c} = \frac{1}{2\pi (12.5) (35)}$$

$$= 3.6 \times 10^{-4} \text{ F}$$