Quiz #4: Huston’s lecture, Feb. 27, 2002

1. For an inductor \( L \) and capacitor \( C \), which answer is correct?
   (a) For \( L \), \( \Delta v \) lags \( i \); and for \( C \), \( i \) leads \( \Delta v \).
   (b) For \( L \), \( \Delta v \) leads \( i \); and for \( C \), \( i \) leads \( \Delta v \).
   (c) For \( L \), \( \Delta v \) leads \( i \); and for \( C \), \( i \) lags \( \Delta v \).
   (d) For \( L \), \( \Delta v \) lags \( i \); and for \( C \), \( i \) lags \( \Delta v \).
   (e) None of the above is correct.

Use the phrase: “ELI the ICE man”

2. For a series \( RLC \) circuit, you are given that the impedance \( Z = 15 \) \( \Omega \) and that \( R = 8.0 \) \( \Omega \). If the rms voltage across \( R \) is \( \Delta V_R = 7.0 \) V, compute the rms voltage across the whole circuit, \( \Delta V \).

   (a) 7.0 V
   (b) 9.4 V
   (c) 11.7 V
   (d) **13.1 V**
   (e) 14.4 V

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   \begin{align*}
   &\text{Given } \Delta V = I \cdot Z. \\
   &\text{Note: } I = \frac{\Delta V_R}{R} \\
   &\Delta V = \left(\frac{\Delta V_R}{R}\right) \cdot Z = \left(\frac{7.0 \text{V}}{8.0 \Omega}\right)(15 \Omega) = 13.1 \text{ V}
   \end{align*}
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