

**Answer on question #59310, Physics / Electric Circuits**

**Question** A certain inductor has an inductance of 0.50H and a resistance of 2.0. It is placed in series with a switch, a 12.0-V battery and a 4.0 ohms resistor. Find the time constant of the circuit and the energy stored in the inductor.

0.83s and 100J

0.032s and 20J

0.47s and 5J

0.083s and 1J

**Solution** Time constant is

$$\tau = \frac{L}{R} = \frac{0.5}{2+4} = \frac{1}{12} \approx 0.083 \text{ s}$$

Energy store is

$$E = \frac{1}{2}LI^2 = \frac{1}{2}L\frac{U^2}{R^2} = \frac{1}{2} \cdot 0.5 \cdot \frac{12^2}{6^2} = 1 \text{ J}$$

Answer is 0.083s and 1J