

Answer on Question #62674, Physics / Electromagnetism

An EMF of 5V is suddenly applied to an LR circuit. The value of the resistor in the circuit is 15. At one inductive time constant, what is the rate at which energy is delivered by the battery?

Solution:

$$P = IU$$

$$I = \frac{U}{R} \left(1 - e^{-\frac{t}{\tau}} \right) = \frac{U}{R} (1 - e^{-1})$$

$$P = \frac{U^2}{R} (1 - e^{-1}) = \frac{5^2}{15} (1 - e^{-1}) = 1.05 \text{ W}$$

Answer: 1.05 W

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