

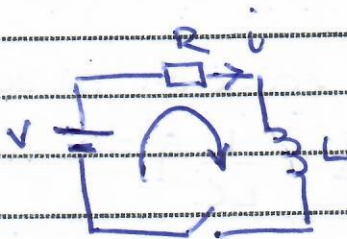
30.25

Datos

$$V = 35 \text{ V}$$

$$R = 50 \Omega$$

$$L = 1.25 \cdot 10^{-3} \text{ H}$$



Aplicando la ley de Kirchhoff

$$-V + iR + L \frac{di}{dt} = 0 \quad \text{dividimos por } L$$

$$-\frac{V}{L} + \frac{R}{L} i + \frac{di}{dt} = 0 \quad \frac{di}{dt} = \frac{V}{L} - \frac{R}{L} i = \frac{V - Ri}{L}$$

$$\frac{di}{dt} = \frac{V - Ri}{L} \quad \text{separando variables} \quad \frac{di}{V - Ri} = \frac{dt}{L}$$

resolviendo la ecuación diferencial:

$$\int_0^i \frac{di}{V - Ri} = \int_0^t \frac{dt}{L} \quad \text{si } y = V - Ri \quad \frac{dy}{di} = -R$$

$$\int_{i(0)}^i \frac{dy}{y} = - \int_0^t \frac{R}{L} dt \quad \ln u \Big|_{i(0)}^i = - \frac{R}{L} t$$

$$\ln(V - Ri) - \ln V = - \frac{R}{L} t$$

$$\ln \left( \frac{V - Ri}{V} \right) = - \frac{R}{L} t$$

$$V - Ri = V e^{-\frac{R}{L} t}$$

$$i = \frac{V}{R} (1 - e^{-\frac{R}{L} t})$$