

PROBLEMA N 8 PAG 1071

$$N = 100 \quad Q = 50 \text{ cm}^2 = 50 \times 10^{-4} \text{ m}^2 \quad t_i = 0 \text{ s} \quad B(t_i) = 0,3 \text{ T}$$

$$t_f = 1,5 \text{ s} \quad B(t_f) = 1,2 \text{ T}$$

$$1) \quad B(t) = B(t_i) + \frac{B(t_f) - B(t_i)}{t_f - t_i} t \quad R = 6,0 \Omega$$

$$i(t) = \frac{1}{R} \frac{d\phi(t)}{dt} = \frac{NA}{R} \frac{dB(t)}{dt} = \frac{NQ}{R} \left(\frac{B(t_f) - B(t_i)}{t_f - t_i} \right)$$

$$= \frac{100 \times 50 \times 10^{-4} \text{ m}^2}{6,0 \Omega} \left(\frac{1,2 \text{ T} - 0,3 \text{ T}}{1,5 \text{ s}} \right) =$$

$$= \frac{0,08 \text{ m}^2}{\Omega} \left(\frac{0,9 \text{ T}}{1,5 \text{ s}} \right) = 0,05 \text{ A}$$

oppure

$$\mathcal{E}_{\text{em}} = -N \frac{\Delta \phi(B(t))}{\Delta t} = -N \frac{[B(t_f)Q - B(t_i)Q]}{\Delta t}$$

$$= -100 \frac{(1,2 \text{ T} - 0,3 \text{ T}) 50 \times 10^{-4} \text{ m}^2}{1,5 \text{ s}} = -\frac{0,45 \text{ V}}{1,5}$$

$$= 0,3 \text{ V}$$

$$i = \frac{\mathcal{E}_{\text{em}}}{R} \quad i(t) = \frac{0,3 \text{ V}}{6,0 \Omega} = 0,05 \text{ A}$$

$$2) \quad B(t) = 0,3 + 0,4t^2$$

$$\mathcal{E}_{\text{em}} = -N \frac{\Delta \phi(B(t))}{\Delta t} = -NQ \frac{dB(t)}{dt} = -NQ \cdot 2 \times 0,4t =$$

$$= -100 \cdot 50 \times 10^{-4} \text{ m}^2 \cdot 0,8 \frac{\text{T}}{\text{s}} t$$

$$i(t) = \frac{\mathcal{E}_{\text{em}}}{R} = 0,067 \frac{\text{A}}{\text{s}} t$$

$$3) \quad Q = \int_{t_{\text{in}}}^{t_{\text{fin}}} i(t) dt = (\bullet) / (\bullet\bullet)$$

$$Q_{\text{lineare}} = 50 \times 10^{-4} \text{ A} (1,5 \text{ s}) = 7,5 \times 10^{-2} \text{ C}$$

(*) lineare:

$$Q = 0,05 t$$

$$Q_{\text{quadratica}} = \frac{0,067 \text{ A}}{2} \text{ s} (1,5 \text{ s})^2 = 7,5 \times 10^{-2} \text{ C}$$

(**) quadratica $Q = \frac{0,067 t^2}{2}$