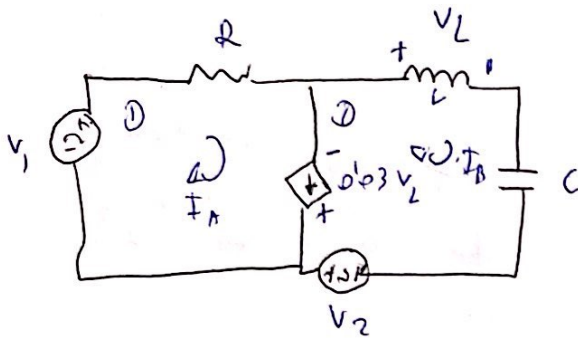


1.



$$R = 100 \, \Omega$$

$$C = 10 \cdot 10^{-6} \text{ F} = 10^{-5} \text{ F}$$

$$L = 200 \text{ mH} = 200 \cdot 10^{-3} \text{ H}$$

$$V_1(t) = \cos(10^3 t + \frac{\pi}{2}) \text{ (V)}$$

$$V_2(t) = 2 \cdot \sin(10^3 t + \frac{4\pi}{3}) \text{ V}$$

$$V_1 = e^{j \frac{\pi}{2}} ; V_2 = 2 \cdot e^{j \frac{4\pi}{3}}$$

a)

Resolvamos el circuito por mallas

Malla 1

$$\sum \mathcal{E} = \sum I R \Rightarrow V_1 - \mathcal{E}_1 = I_A \cdot (Z_R) \quad (1)$$

Malla 2

$$\mathcal{E}_1 - V_2 = I_B \cdot (Z_C + Z_L)$$

$$\mathcal{E}_1 = I_B \cdot (Z_C + Z_L) \quad (2)$$

$$(1) \quad \mathcal{E}_1 = -100 I_A + e^{j \frac{\pi}{2}} = -100 I_A + j$$

$$(2) \quad \mathcal{E}_1 = I_B \cdot (Z_C + Z_L) = I_B \cdot (100j)$$

$$(1) \quad \mathcal{E}_1 = -100 \cdot (I_B) \cdot (6j + 1) + j$$

$$(2) \quad \mathcal{E}_1 = I_B \cdot (100j)$$

$$-100 I_B \cdot (6j + 1) + j = I_B \cdot 100j$$

$$600j I_B - 100 I_B = I_B \cdot 100j$$

$$600j I_B - 100j I_B - 100 I_B = 0$$

$$500j I_B - 100 I_B = 0$$

$$I_B \cdot (500j - 100) = 0 \quad \begin{matrix} I_B = 0 \\ I_B = 509.92j \end{matrix}$$

$$0.03 V_2 = I_A - I_B$$

$$V_2 = I_B \cdot Z_L = I_B \cdot 200j$$

$$0.03 \cdot (I_B \cdot 200j) = I_A - I_B$$

$$I_B \cdot 6j = I_A - I_B$$

$$I_A = I_B \cdot (6j + 1)$$

$$-100 I_B \cdot (6j + 1) I_j = I_B \cdot 100j$$

$$I_B \cdot 100j - 100 I_B = I_j + 1$$

$$I_B \cdot (100j - 100) = I_j + 1$$

$$I_B = 0.03 - 0.04j = 0.05 \cdot e^{j-0.922}$$

$$I_B = 0.05 \cdot e^{j-0.922} \text{ A}$$

$$I_A = (6j + 1) \cdot I_B = 6.08 e^{j1.406} \cdot I_B$$

$$I_A = 0.1304 \cdot e^{j0.479}$$

La potencia instantánea en la ventana es:

$$p(t) = \frac{VI}{2} \cdot [\cos(2\omega t + \alpha_v + \alpha_i) + \cos(\alpha_v - \alpha_i)]$$

La intensidad que atraviesa A es I_A

$$i_A(t) = 0.1304 \cdot \cos(10^3 t + 0.479) \text{ A}$$

$$v_A(t) = \cos(10^3 t + \pi/6)$$

$$v = e^{j\pi/6}$$

$$i = 0.1304 \cdot e^{j0.479}$$

$$p(t)_A$$

$$\bar{p} =$$

$$0.5) + 0.461]$$

$$2.05$$

$$0.461 = 0.07 \cdot e^{j2.05} \text{ W}$$

$$V = 1 \text{ V}$$

$$I = 0.1304 \text{ A}$$

$$p(t) = \frac{0.1304}{2} \cdot [\cos(2 \cdot 10^3 t + 2.05) + 0.461] =$$

$$= 0.152 \cdot [\cos(2 \cdot 10^3 t + 2.05) + 0.461] \text{ W}$$

$$\bar{p} = 0.152 \cdot 0.461 = 0.07 \text{ W}$$

b) Potencia media bobina

$$P_m = \frac{1}{T} \cdot \int_0^T \frac{V^2}{2L\omega} \cdot \sin(2\omega t) dt = -\frac{V_m^2}{2L\omega t} \cdot \int_0^T \sin(2\omega t) dt = 0$$

Puesto que la bobina es una carga reactiva, en un ciclo completo no consume ni cede potencia y por tanto la potencia media es 0