

5.35 $i(t) = [5 + 2\cos(400t + 30^\circ) + 0.5\cos(800t - 45^\circ)]$

Resistor is $2k\Omega$

Instant power consumption $= P(t) = i(t)^2 \cdot R = \frac{u(t)^2}{R}$

$$P_x = \frac{1}{T} \int_0^T |x(t)|^2 dt$$

$$P(t) = [5 + 2\cos(400t + 30^\circ) + 0.5\cos(800t + 45^\circ)]^2 \cdot 2$$

$$= [25 + 4\cos^2(400t + 30^\circ) + 0.25\cos^2(800t + 45^\circ)] \cdot 2$$

$$\Rightarrow [50 + 8\cos^2(400t + 30^\circ) + 0.5\cos^2(800t + 45^\circ)]$$

$$\Rightarrow 50 + \int_0^{T_0} 8\cos^2(400t + 30^\circ) + \int_0^{T_0} 0.5\cos^2(800t + 45^\circ)$$

$T_0 = 2\pi$ since 2π is period of cos function

$$= 50 + \frac{2\pi}{2} + \frac{2\pi}{2} = 50 + \pi + \pi = 50 + 2\pi \checkmark$$