Sample Calculations for Lab 08

Be sure to include correct units with your calculations

(1) An inductor has L=470 μH and a capacitor has C=470 μf. If these two elements are in series, calculate the resonant frequency (f) of the circuit.

(2) If the inductor and capacitor are placed in a series circuit with a resistor R=100Ω, calculate the following at f=60 Hz:

X_c

X_L

Z

tan φ

the power factor (cos φ)

(3) Suppose an AC voltage has V_m=10 V and is operated at a frequency of f=60 Hz. The voltage is applied to the series RLC circuit with the elements given above.

Calculate V_{RMS}

Calculate I_{rms} from $V_{rms} = I_{rms} Z$

Calculate the time average power <P> radiated by the resistor. You will need the power factor: cos(φ) here.