

## PHY114 S09 Problem Set 7

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March 30 2009

1. A coil has  $3.50\Omega$  resistance and  $490\text{mH}$  inductance. If the current is  $3.29\text{ A}$  and is increasing at a rate of  $3.97\text{ A/s}$ , what is the potential difference across the coil at this moment?
2. How much resistance  $R$  must be added to a pure LC circuit to change the oscillator's frequency by  $0.25\%$ ? Will it be increased or decreased?
3. A  $31\text{mH}$  inductor with  $3.0\Omega$  resistance is connected in series to  $26\mu\text{F}$  capacitor and a  $25\text{Hz}$ ,  $29\text{V(rms)}$  source.. Calculate the rms current.
4. An LRC series circuit with  $R = 200\Omega$ ,  $L = 32\text{mH}$ , and  $C = 2.5\mu\text{F}$  is powered by an ac voltage source of peak voltage  $V_0 = 200\text{V}$  and frequency  $f = 770\text{Hz}$ . Determine the peak current that flows in this circuit.
5. An LRC circuit has  $L = 4.65\text{mH}$  and  $R = 3.18\text{k}\Omega$ . What value must  $C$  have to produce resonance at  $25.2\text{kHz}$ ? What will be the maximum current at resonance if the peak external voltage is  $124\text{V}$ ?