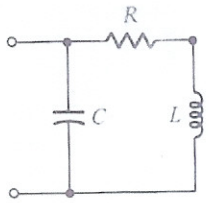
Serial #

King Fahd University of Petroleum & Minerals
Electrical Engineering Department
EE205: Electric Circuits II (031)
Quiz 5

Name: KEY assume you know the approximation formula ID# Sec 01

For the practical tank circuit shown in the figure



R=**0.002 Ω**, L=2 H, and $C=\frac{1}{50}$ F

a) Find the resonance frequency of the circuit
b) Find the quality factor of the circuit

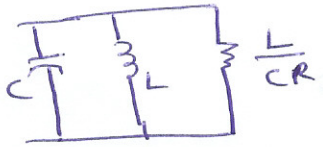
a) Assume high Quality Coil

$$\omega_r = \frac{1}{\sqrt{LC}} = \frac{1}{\sqrt{2\,\frac{1}{50}}} = \boxed{5 \text{ rad/s}}$$

CHECK the assumption.

$$Q_{coil} = \frac{|X_s|}{R_s} = \frac{\omega L}{R_s} = \frac{5(2)}{0.002} = 5000 \gg 1 \quad \text{assumption is good.}$$

b) We can approximate the circuit to



the new $R_{new} = \frac{L}{CR} = \frac{2}{\frac{1}{50}(0.002)} = 50\,K\Omega$

$$Q_{||} = \omega_r RC = (5)(50K)\left(\frac{1}{50}\right) = \boxed{5000}$$

Good Luck,
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