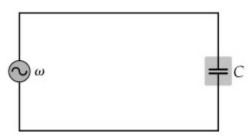Ch. 24 practice questions
Will be discussed in class Friday 6/6

1) A coil with a self-inductance of 6.0 H is connected to a dc source through a switch. As soon as the switch is closed at $t = 0$ s, the rate of change of current is 2.0 A/s. What is the emf induced in this coil at $t = 0$ s?
A) 6.0 V
B) 3.0 V
C) 12 V
D) 1/3 V
E) 0 V

2) Figure above shows a simple ac circuit composed of a capacitor connected across the terminals of an ac generator. If the frequency (in Hz) of the generator is doubled, what happens to the capacitive reactance of the capacitor?
A) It increases by a factor of 4.
B) It increases by a factor of 2.
C) It increases by a factor of $\sqrt{2}$.
D) It decreases by a factor of 2.
E) It decreases by a factor of 4.

3) In a series RLC circuit, the values of the inductance and capacitance are both doubled. In comparison with the resonance frequency of the original circuit, the new resonant frequency will be
A) the same as before.
B) reduced to one-half the original value.
C) reduced to one-quarter the original value.
D) increased by a factor of two.
E) increased by a factor of four.

4) A generator produces EMF = 100 volts RMS and is connected to an inductor with L= 200 mH. The current I = 2 amperes RMS. What is the frequency of the EMF, in Hz?

A) 40 Hz
B) 250 Hz
C) 160Hz
D) 60 Hz
E) none of the above

reactance: $X_L = \omega L = 2\pi f L$

current: $I = V / X_L \rightarrow 2A = 100V / \left[2\pi f (0.20H) \right]$

$f = \dfrac{100V}{2\pi(0.20H)(2A)} = 39.7Hz$