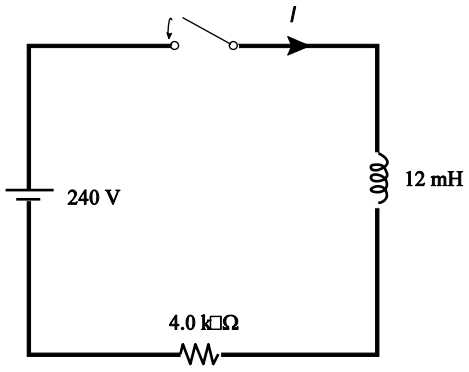
PHYS 2326 University Physics II – Class number -

QUIZ - #3
CHAPTERS: 30,31,32,33,34

JULY 31, 2013

1. The switch in the figure is closed at $t = 0$ when the current I is zero. When $I = 15$ mA, what is the potential difference across the inductor?



a. 240 V
b. 60 V
c. 0
d. 180 V
e. 190 V

2. A series LC circuit contains a 100 mH inductor, a 36.0 mF capacitor and a 12 V battery. The angular frequency of the electromagnetic oscillations in the circuit is

a. 36.0×10^{-4} rad/s.
b. 6.00×10^{-2} rad/s.
c. 2.78 rad/s.
d. 16.7 rad/s.
e. 277 rad/s.

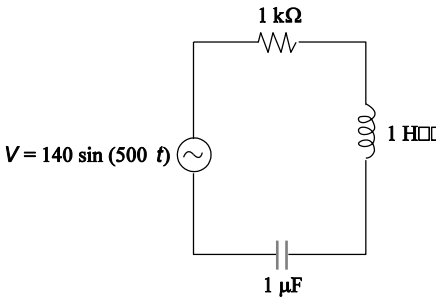
3. A 0.5-H inductor is connected into a 110 V-rms 60-Hz voltage source, with an ammeter in series. What is the rms value of the current through the inductor?

a. 0.189 A (rms)
b. 0.292 A (rms)
c. 0.584 A (rms)
d. 1.19 A (rms)
e. 0.093 A (rms)

4. Find the resonant frequency for a series *RLC* circuit where $R = 10\Omega$, $C = 5\ \mu F$, and $L = 2$ mH.

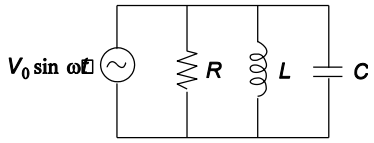
a. 998 Hz
b. 1.592 kHz
c. 2.45 kHz
d. 11.3 kHz
e. 2.53 kHz

5. Determine the rms voltage drop across the capacitor in the circuit.



a. 55 V
b. 77 V
c. 110 V
d. 154 V
e. 198 V

BONUS: The phase angle between V and I is



a. $\tan^{-1}\left[\frac{R}{X_C} - \frac{R}{X_L}\right]$

b. $\tan^{-1}\left(\frac{R}{X_C - X_L}\right)$

c. $\tan^{-1}\left(\frac{X_C - X_L}{R}\right)$

d. $\tan^{-1}\frac{R}{\sqrt{R^2 + (X_L - X_C)^2}}$

e. $\tan^{-1}\sqrt{R^2 + (X_L - X_C)^2}$

BONUS: If the maximum E-component of an electromagnetic wave is 600 V/m, what is the maximum B-component?

a. 1.4 T
b. 1.8×10^{-5} T
c. 2.0×10^{-6} T
d. 1.0×10^{-3} T
e. 1.6×10^{-10} T

BONUS: Find the force exerted by reflecting sunlight off a reflecting aluminum sheet in space if the area normal to the sunlight is 10 000 m^2 and the solar intensity is 1350 W/m^2.

a. 0.72 N
b. 0.09 N
c. 9 N
d. 45 N
e. 0.18 N