

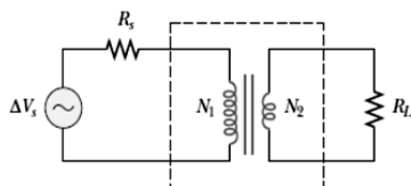
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Chapter 32-34, Serway; ANY TYPES OF CHEATING WILL MAKE YOU FAIL!

Please write down the answers on the blank space or on the back of this paper. Answer should be in English. [] indicates the question points.

Q1. (a) Suppose you want to make a radio tuning circuit using LC combination. If you connect a inductor of 5-mH in series with a variable capacitor C for a shortwave radio set. What capacitance will tune your circuit to a resonance frequency 10 MHz, transmitted from a radio broadcasting station? (b) Now if you add a resistance of 1.00 k Ω into this circuit, what type of oscillation will be produced by your circuit? Calculate the frequency of that newly generated oscillation. (c) By what percentage does the frequency of that oscillation differ from the resonance frequency? [15+15+10= 40]

Q2. Now let you are designing a transformer to supply power to your radio as show in figure below. Your source voltage is 110V (rms), turns ratio of the inductors N_1/N_2 is 2.5. (a) How much load resistance R_L do you need to set up to supply 6V plug in voltage into radio? Let the source resistance is $R_S= 100\Omega$. (b) Calculate the load current. [20+10=30]



Q3. (a) What is the source of electromagnetic wave? Write down a major difference between mechanical and electromagnetic wave. (b) Let a plane electromagnetic sinusoidal wave propagates in the x direction. Suppose the wavelength of it is 532 nm and the electric field vibrates in the xy plane with amplitude of 25 V/m. Calculate the frequency of the wave and (c) the magnitude of magnetic field B when the electric field has its maximum value in the negative y direction. [10+10+10=30]

