Electronic Circuits **Homework 4**

1. Determine the total inductance of each circuit in Figure 1. (11-12)

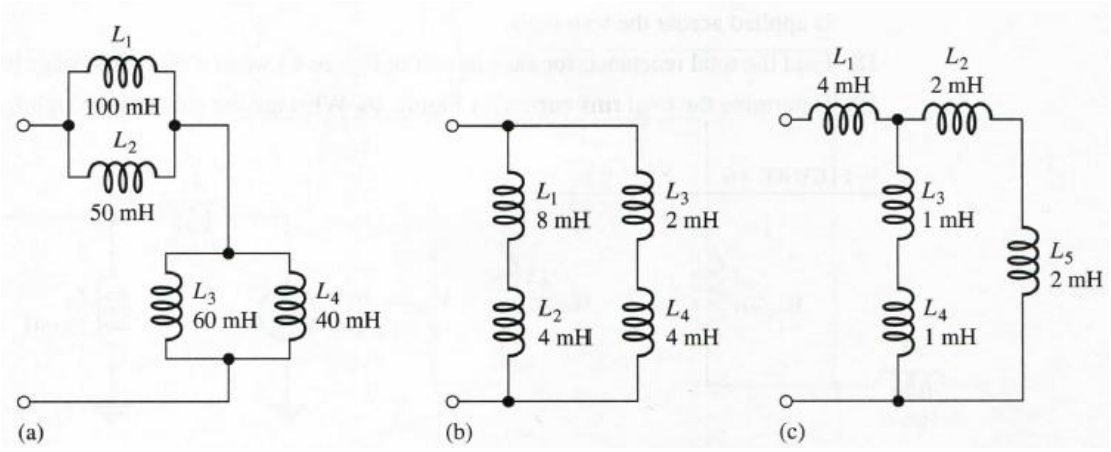

Figure 1

2. Determine the time constant for each of the following series RL combinations:
   (a) R=100Ω, L=100μH (b) R=4.7kΩ, L=10mH (c) R=1.5MΩ, L=3H (11-13)

3. In the circuit of Figure 2, there is initially no current. Determine the inductor voltage at the following times after the switch is closed:
   (a)10μs (b) 20μs (c) 30μs (d) 40μs (e) 50μs (11-15)

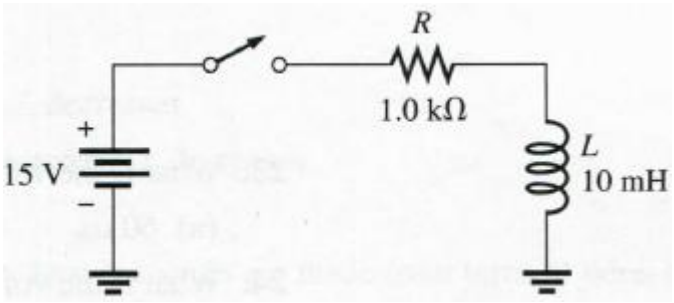

Figure 2

4. Determine the impedance and phase angle in each circuit in figure 3. (12-4)

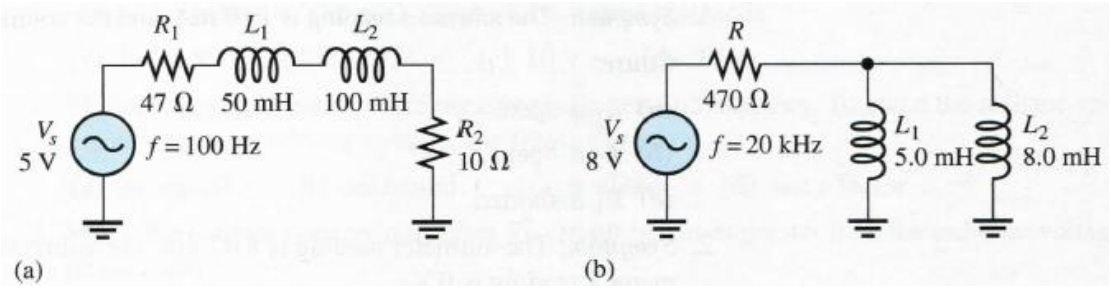

Figure 3

5. Draw the waveforms for V_s, V_R, and V_L in Figure 4. Show the proper phase relationships. (12-13)

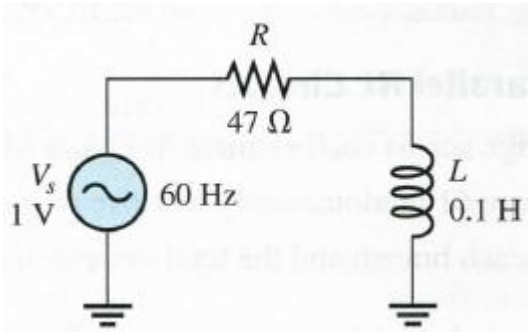

Figure 4

6. Plot the response curve for the circuit in Figure 5. Show the output voltage versus frequency in 1 kHz increments from 0 Hz to 5 kHz. (12-30)

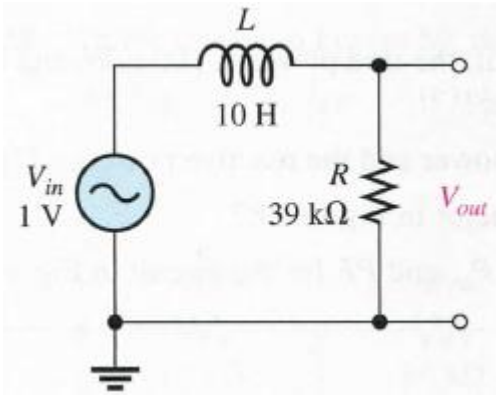

Figure 5

7. A certain series RLC circuit operates at a frequency of 5 kHz and has the following values:
   R=10Ω, C=0.047μF, and L=5mH. Determine the impedance and phase angle. What is the total reactance? (13-1)

8. For the RLC circuit in Figure 6, determine the resonant frequency and the cutoff frequencies. (13-11)

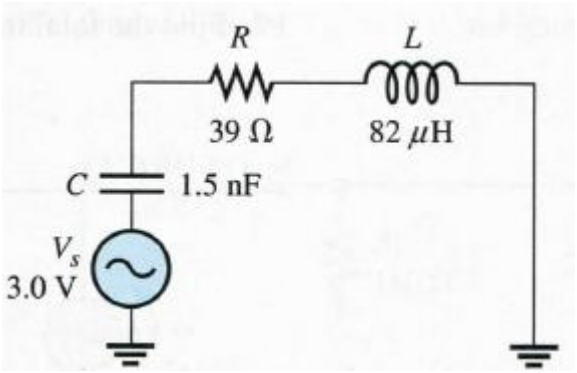

Figure 6

9. Determine f_r and BW for each filter in Figure 7. (13-15)

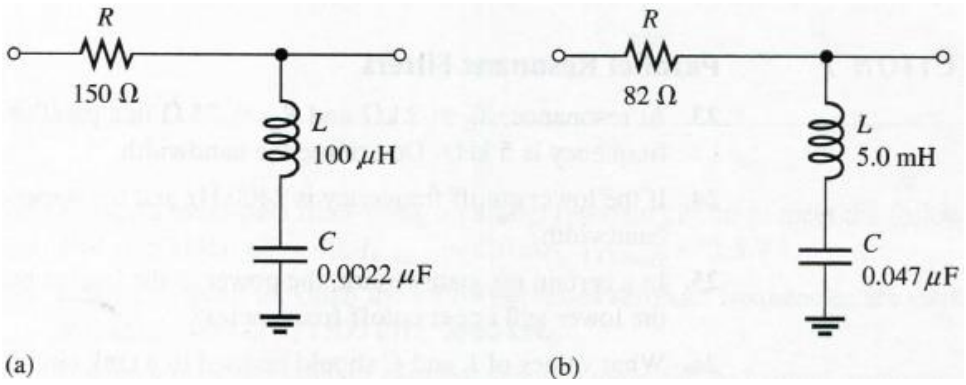

Figure 7

10. Determine the following quantities in Figure 8 :
    (a) secondary voltage
    (b) secondary current
    (c) primary current
    (d) power in the load (7th14-18)

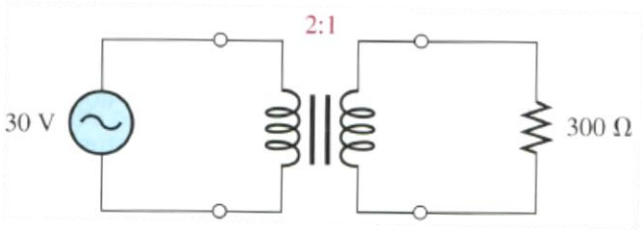

Figure 8

11. In Figure 9, what is the maximum power in watts delivered to the speaker? (7th14-24)

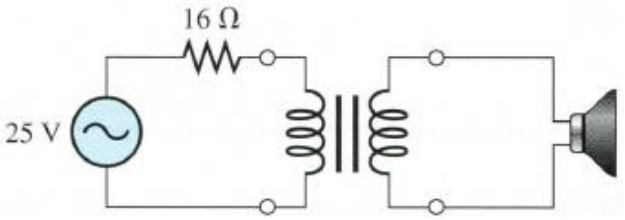

Figure 9

12. Determine the output voltage for the circuit in Figure 10. A single-pulse input is applied as shown. (14-16)

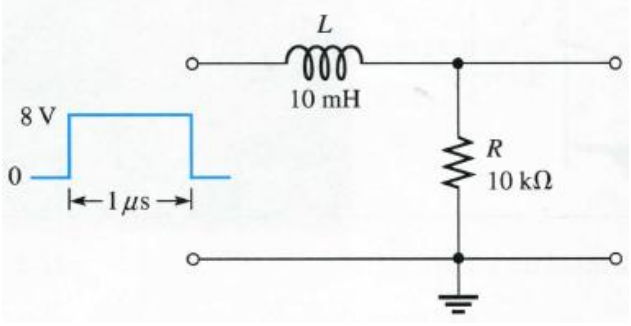

Figure 10

13. (a) What is τ in Figure 11?

(b) Draw the output voltage. (14-18)

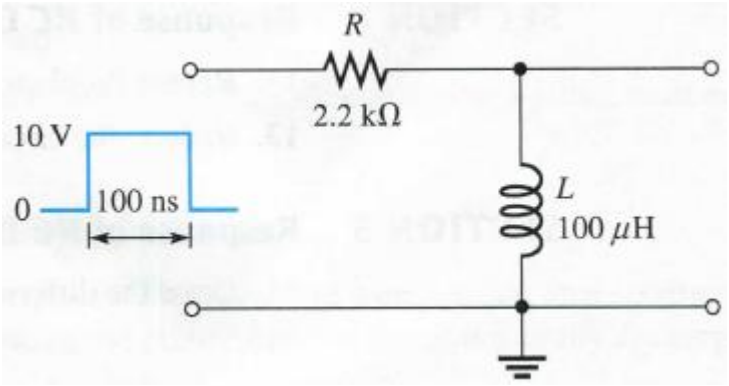

Figure 11