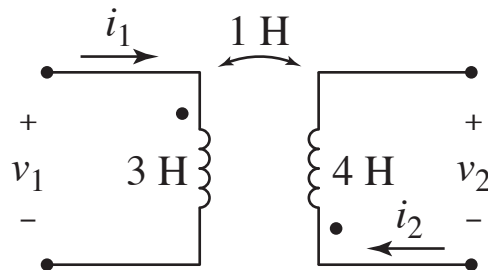


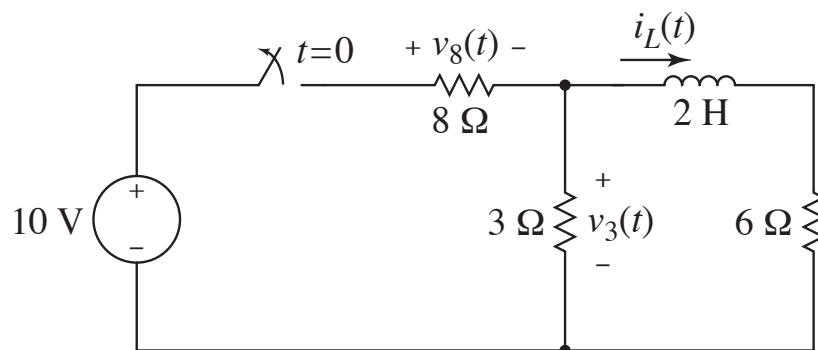
**Due Sunday, Mar. 23, 2025 by 11:59 p.m.**

**NOTE:** This is only the “handwritten” portion of Homework 8. There are also problems you must do online via the Mastering site. For this handwritten portion you must submit a PDF scan of your work at Canvas. Please ensure your work is contained in a single file and is legible.

1. For the mutually coupled inductors shown below,  $i_1(t) = 4 \cos(200t)$  A and  $i_2(t) = 2 \exp(-150t^2)$  A (and  $t$  is assumed to be in seconds). What are the voltages  $v_1(t)$  and  $v_2(t)$ ?



2. Problem 6.39 from Nilsson and Riedel. Part (a) only.
3. Prior to  $t = 0$ , the switch in the circuit below had been closed for a “long time” (such that the circuit was in steady state). At  $t = 0$ , the switch opens, effectively removing the source from the remainder of the circuit.
- What are  $i_L(0^-)$  and  $v_3(0^-)$ ?
  - What are  $i_L(0^+)$  and  $v_3(0^+)$ ?
  - What is the  $L/R$  time constant?
  - What are the expressions for  $i_L(t)$ ,  $v_3(t)$ , and  $v_8(t)$  (for all  $t$ )?



(Continued on next page.)

4. Prior to  $t = 0$ , the switch in the circuit below had been open for a “long time” (such that the circuit was in steady state). At  $t = 0$ , the switch closes, effectively isolating the current source from the rest of the circuit.

- (a) What is the energy stored on the capacitor at  $t = 0$ ?
- (b) What is the  $RC$  time constant?
- (c) What are the expressions for  $v_C(t)$  and  $v_R(t)$  (*for all  $t$* )?

