7.37 The switch in the circuit shown in Fig. P7.37 has been in position a for a long time. At $t = 0$, the switch moves instantaneously to position b.
   a) Find the numerical expression for $I_d(t)$ when $t \geq 0$.
   b) Find the numerical expression for $v_a(t)$ for $t \geq 0^+$.

Figure P7.37

7.38 The switch in the circuit shown in Fig. P7.58 has been in the off position for a long time. At $t = 0$, the switch moves instantaneously to the on position. Find $v_o(t)$ for $t = 0$.

Figure P7.58

7.39 The voltage waveform shown in Fig. P7.79(a) is applied to the circuit of Fig. P7.79(b). The initial current in the inductor is zero.
   a) Calculate $v_o(t)$.
   b) Make a sketch of $v_o(t)$ versus $t$.
   c) Find $I_o$ at $t = 5$ ms.

Figure P7.79

7.50 The switch in the circuit shown in Fig. P7.50 has been closed a long time before opening at $t = 0$.
   a) What is the initial value of $I_d(t)$?
   b) What is the final value of $I_d(t)$?
   c) What is the time constant of the circuit for $t \geq 0$?
   d) What is the numerical expression for $I_d(t)$ when $t \geq 0^+$?
   e) What is the numerical expression for $v_a(t)$ when $t \geq 0^+$?

Figure P7.50

7.52 The switch in the circuit seen in Fig. P7.52 has been in position a for a long time. At $t = 0$, the switch moves instantaneously to position b. For $t \geq 0^+$, find
   a) $v_a(t)$.
   b) $I_d(t)$.
   c) $v_b(t)$.
   d) $v_s(0^+)$. 

Figure P7.52

7.81 The voltage waveform shown in Fig. P7.81(a) is applied to the circuit of Fig. P7.81(b). The initial voltage on the capacitor is zero.
   a) Calculate $v_a(t)$.
   b) Make a sketch of $v_a(t)$ versus $t$.

Figure P7.81
The capacitor in the circuit shown in Fig. P7.84 is charged to 20 V at the time the switch is closed. If the capacitor ruptures when its terminal voltage equals or exceeds 20 kV, how long does it take to rupture the capacitor?

**Figure P7.84**

The inductor current in the circuit in Fig. P7.86 is 25 mA at the instant the switch is opened. The inductor will malfunction whenever the magnitude of the inductor current equals or exceeds 5 A. How long after the switch is opened does the inductor malfunction?

**Figure P7.86**