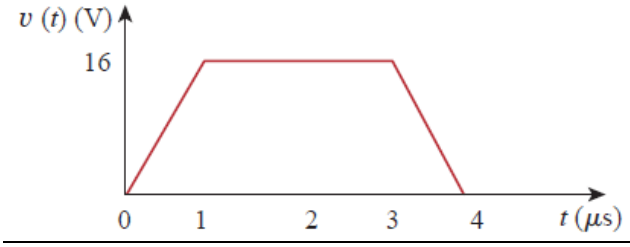
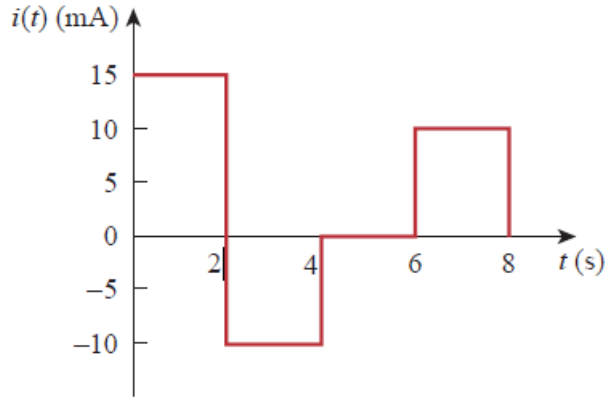
6.1 If the voltage across the 7.5-F capacitor is $2te^{-3t}$ V, find the current and the power as a function of time.

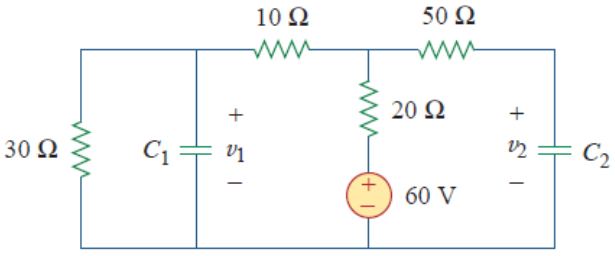
6.10 The voltage across a 2-mF capacitor is shown below. Determine the current through the capacitor as a function of time, i(t).



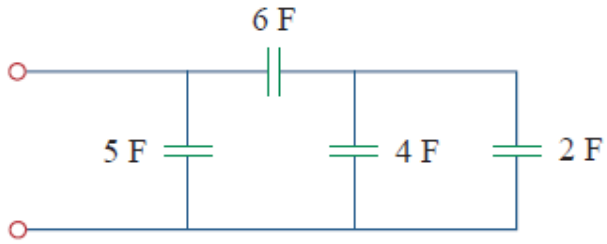
6.11 A 4-mF capacitor has the current waveform shown in Fig. 6.48. Assuming that sketch the voltage waveform $v(t)$.



6.13 Find the voltage across the capacitors in the circuit under dc conditions.



6.17b Determine the equivalent capacitance.

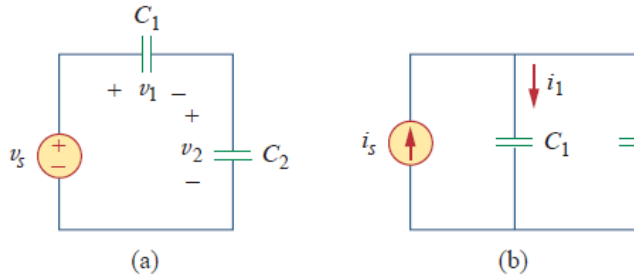


6.25a only

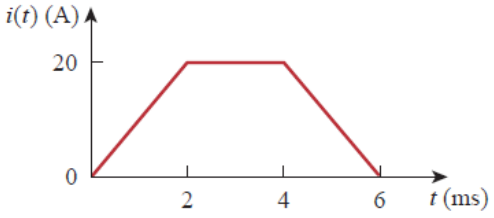
6.25 (a) Show that the voltage-division rule for two capacitors in series as in Fig. 6.59(a) is

$$v_1 = \frac{C_2}{C_1 + C_2} v_s, \qquad v_2 = \frac{C_1}{C_1 + C_2}$$

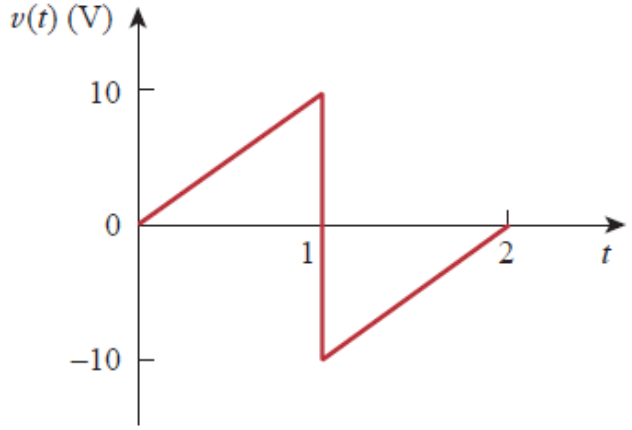
assuming that the initial conditions are zero



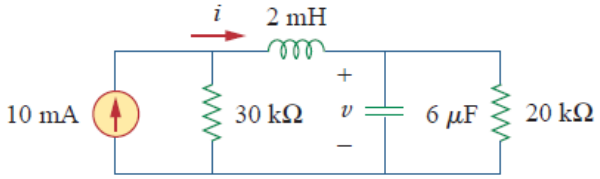
6.40 The current through a 10-mH inductor is shown in Fig. 6.66. Determine the voltage across the inductor at t = 1, 3, and 5 ms.



6.45 If the voltage waveform in Fig. 6.68 is applied to a 50-mH inductor, find the inductor current Assume $i(0) = 0$.



6.48 Under steady-state dc conditions, find i and v in the circuit of Fig. 6.71.



Numerical Answers

6.1 $15(1-3t)e^{-3t}$ A ; $30t(1-3t)e^{-6t}$ W

6.10
$$i(t) = \begin{cases} 32 \text{ kA} & 0 < t < 1\ \mu s \\ 0 & 1 < t < 3\ \mu s \\ -32 \text{ kA} & 3 < t < 4\ \mu s \end{cases}$$

6.11
$$v(t) = \begin{cases} 10 + 3.75t \text{ V} & 0 < t < 2 \text{ s} \\ 22.5 - 2.5t \text{ V} & 2 < t < 4 \text{ s} \\ 12.5 \text{ V} & 4 < t < 6 \text{ s} \\ 2.5t - 2.5 \text{ V} & 6 < t < 8 \text{ s} \end{cases}$$

6.13 42 V, 48 V

6.17b 8 F

6.25 *Hint*: the charge on each capacitor must be the same.

6.40
$v(1) = 25$ V
$v(3) = 0$ V
$v(5) = -25$ V

6.45
$$i(t) = \begin{cases} 250t^2 \text{ A} & 0 < t < 1 \text{ s} \\ [0.250t^2 - t + 1] \text{ kA} & 1 < t < 2 \text{ s} \end{cases}$$

6.48 $i = 3$ mA; $v = 60$ V
