

EJERCICIO CLASE DEL MIERCOLES

6.16 The equivalent capacitance at terminals $a-b$ in the circuit of Fig. 6.50 is $30\ \mu\text{F}$. Calculate the value of C .

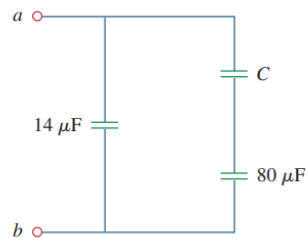


Figure 6.50

For Prob. 6.16.

$$\begin{aligned}
 C_{ab} &= \frac{C \cdot 80\mu\text{F}}{C + 80\mu\text{F}} + 14\mu\text{F} \\
 C_{ab} &= 30\mu\text{F} = \frac{C \cdot 80\mu\text{F}}{C + 80\mu\text{F}} + 14\mu\text{F} \\
 16\mu\text{F} \cdot (C + 80\mu\text{F}) &= C \cdot 80\mu\text{F} \\
 16\mu\text{F} \cdot C + 1280\mu\text{F} &= C \cdot 80\mu\text{F} \\
 \frac{1280\mu\text{F}}{80\mu\text{F} - 16\mu\text{F}} &= C \\
 20\mu\text{F} &= C \quad \text{R/}
 \end{aligned}$$

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6.63 In the circuit of Fig. 6.85, sketch v_o .

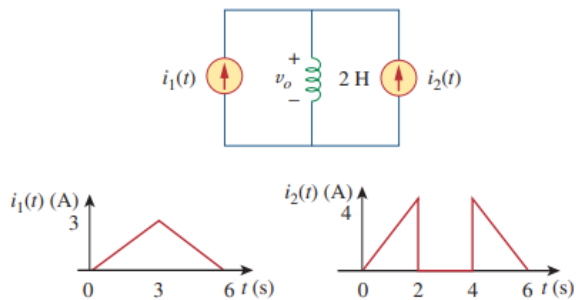
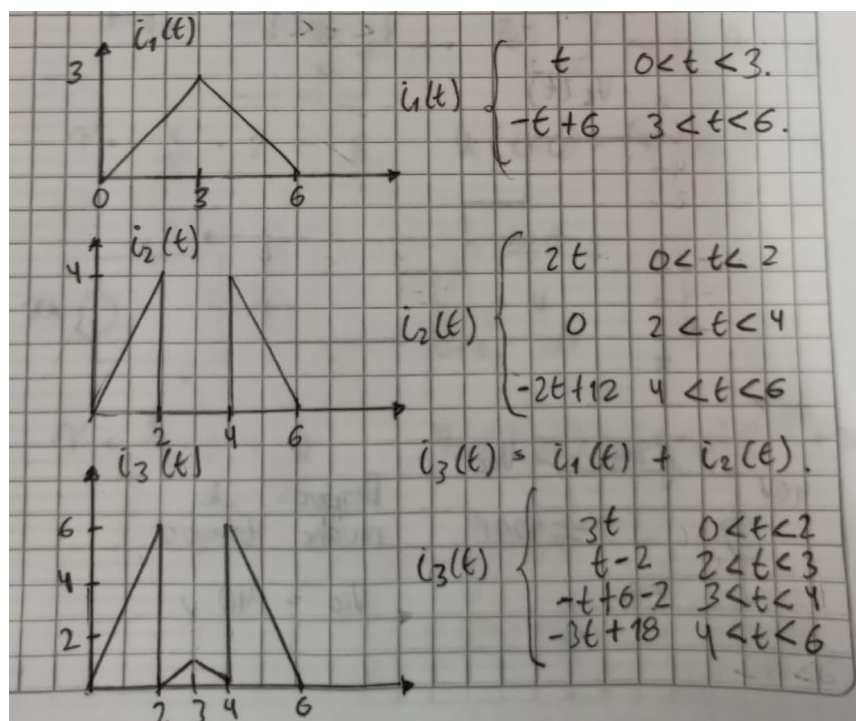
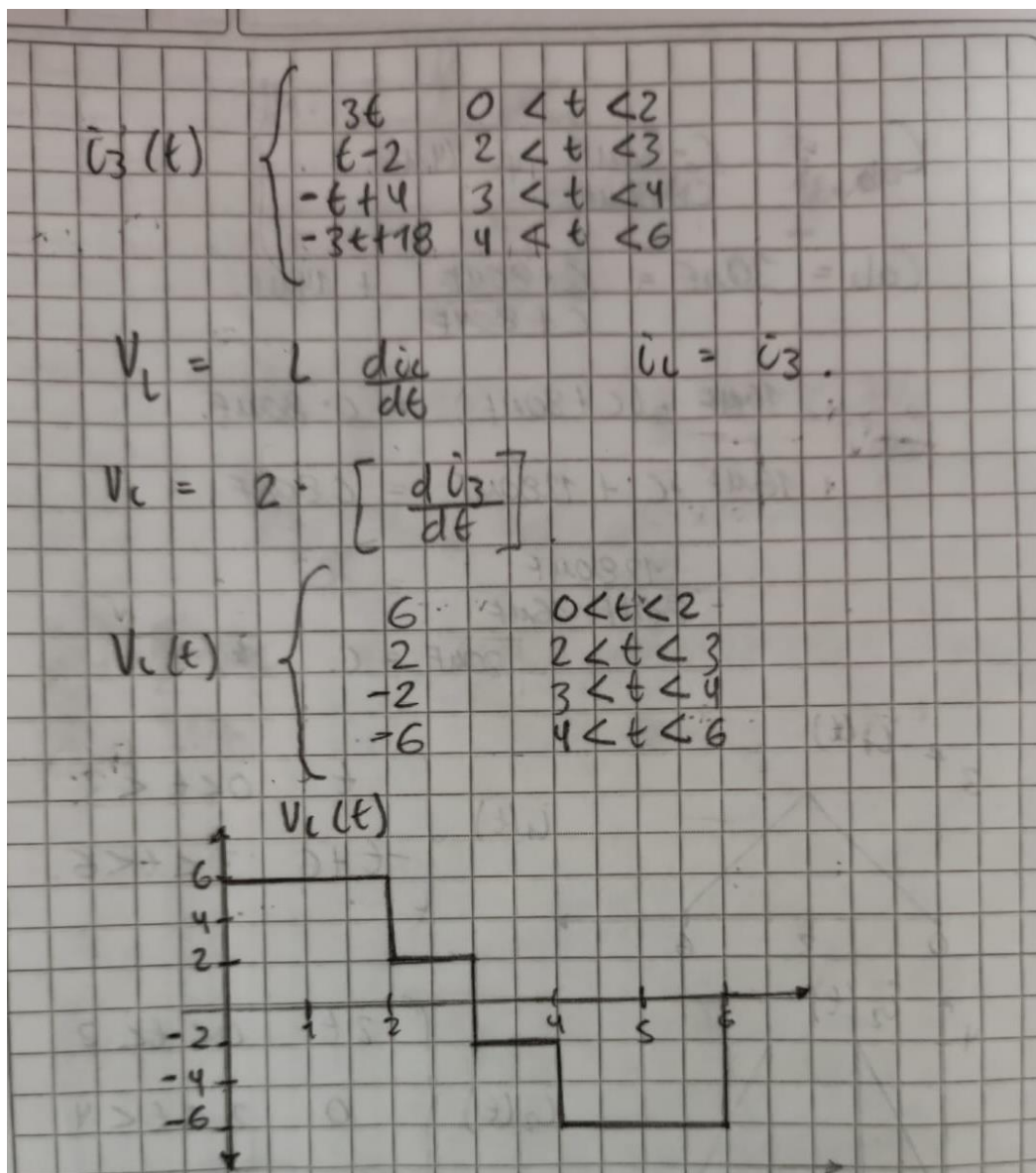


Figure 6.85
For Prob. 6.63.





EJERCICIO CLASE DEL VIERNES

- 7.4 The switch in Fig. 7.84 has been in position A for a long time. Assume the switch moves instantaneously from A to B at $t = 0$. Find v for $t > 0$.

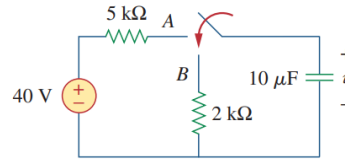
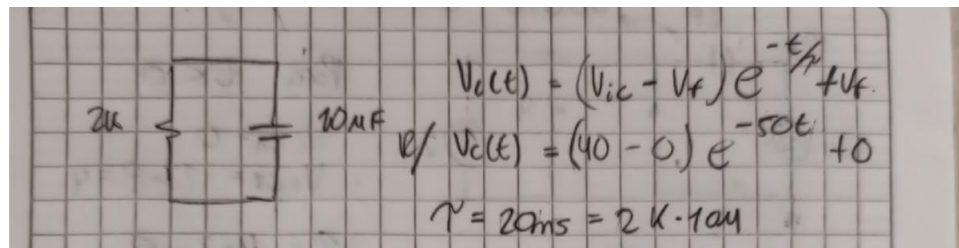
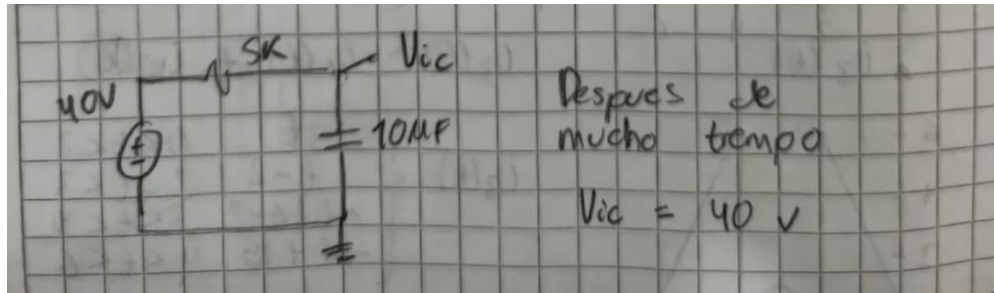


Figure 7.84
For Prob. 7.4.



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7.39 Calculate the capacitor voltage for $t < 0$ and $t > 0$ for each of the circuits in Fig. 7.106.

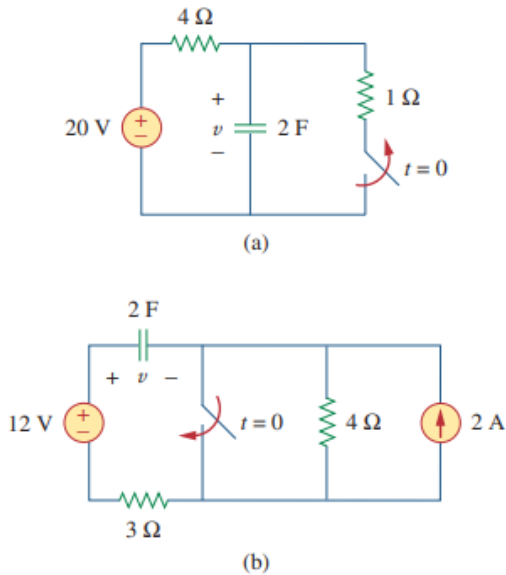


Figure 7.106
For Prob. 7.39.

Handwritten Solution for Problem 7.39(a):

$t < 0$

Circuit diagram for $t < 0$ shows the switch closed. The capacitor voltage is V_C .

Initial conditions:

$$V_{C1} = 0$$

$$V_{fC1} = 20 \cdot \frac{1}{5} = 4$$

Equivalent circuit for $t < 0$ shows the capacitor in parallel with the 1Ω resistor, and this combination in parallel with the 4Ω resistor. The equivalent resistance is $R_{eq1} = \frac{4}{5}$.

Time constant:

$$\tau = \frac{4}{5} \cdot 2 = \frac{8}{5}$$

Capacitor voltage for $t < 0$:

$$V_C(t < 0) = (4 - 0)e^{-\frac{5}{8}t} + 4$$

$t > 0$

Circuit diagram for $t > 0$ shows the switch open. The capacitor is in parallel with the 20V source.

Initial conditions:

$$V_{C2} = 4$$

$$V_{fC2} = 20$$

Time constant:

$$\tau = 4 \cdot 2 = 8$$

Capacitor voltage for $t > 0$:

$$V_C(t > 0) = (4 - 20)e^{-\frac{t}{8}} + 20$$

