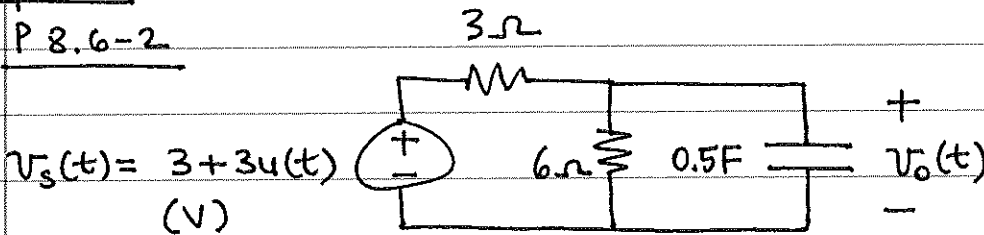


p. 359

P 8.6-2

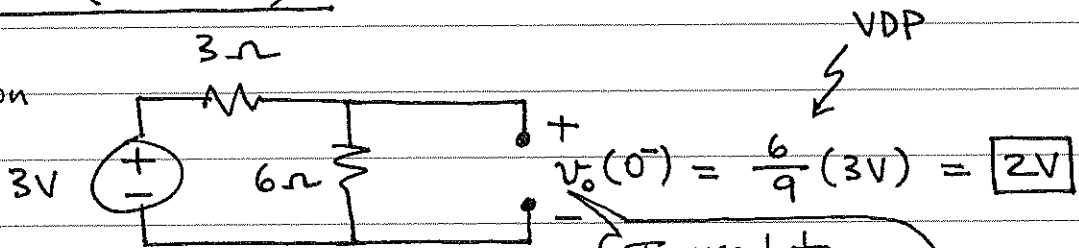


At  $t=0^-$  (SS holds):

Step function

I'm still off!

I will step in at  $t=0$ !

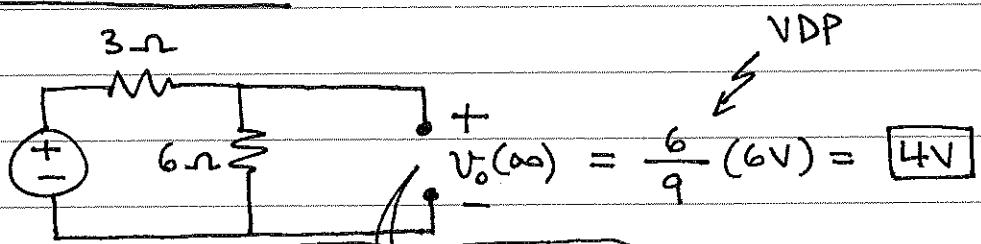


I used to be a capacitor!

$\therefore v_o(0^+) = v_o(0^-) = \boxed{2V}$

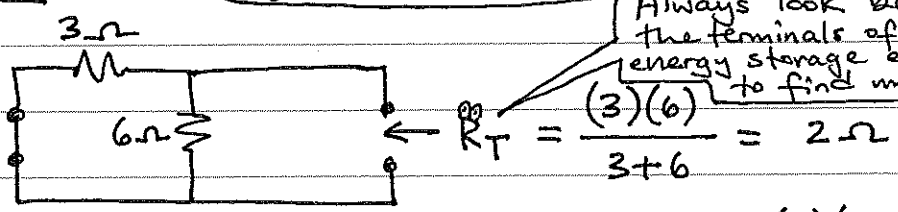
At  $t=\infty$  (SS holds):

Mr. Capacitor, FBI secret agent on a secret mission!



I'm a capacitor but I'm disguising my identity!

To find  $R_T$ :



Always look between the terminals of the energy storage element to find me!

$\therefore \tau = R_T C = (2)(0.5) = 1 \text{ sec}$

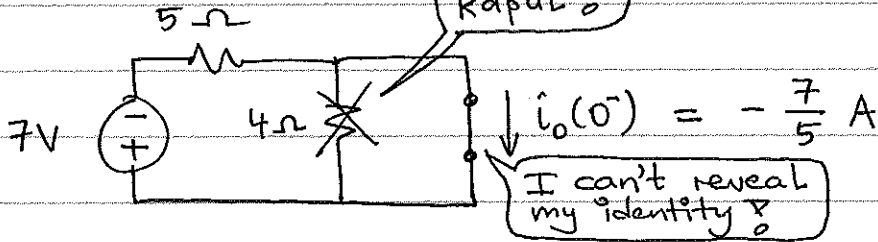
$\therefore v_o(t) = 2e^{-t} + 4(1 - e^{-t}) = 4 - 2e^{-t} \text{ (V)}$

(either is acceptable)

p. 359

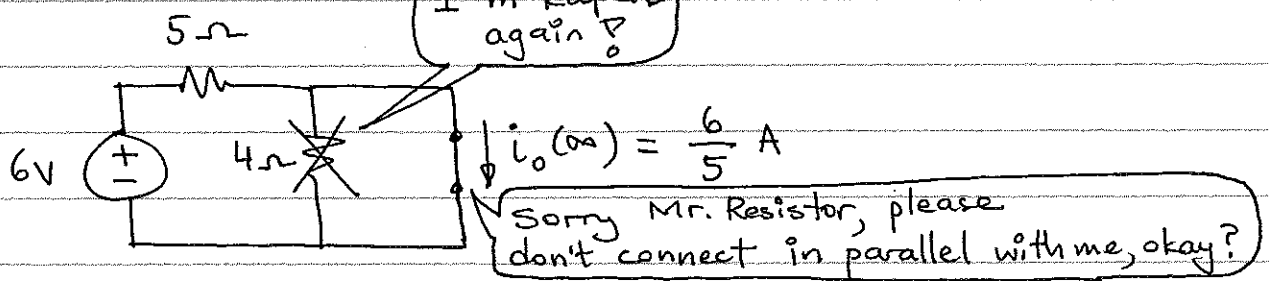
P 8.6-3

At  $t = 0^-$  (SS):



$$\therefore i_o(0^+) = i_o(0^-) = -\frac{7}{5} \text{ A}$$

At  $t = \infty$  (SS):

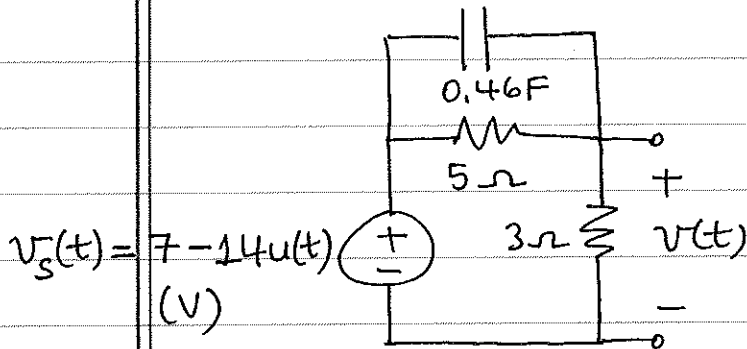


$$\tau = \frac{L}{R_T} = \frac{1.2}{5//4} = \frac{1.2}{\left[\frac{(5)(4)}{9}\right]} = \frac{40.8}{20} = \frac{27}{50}$$

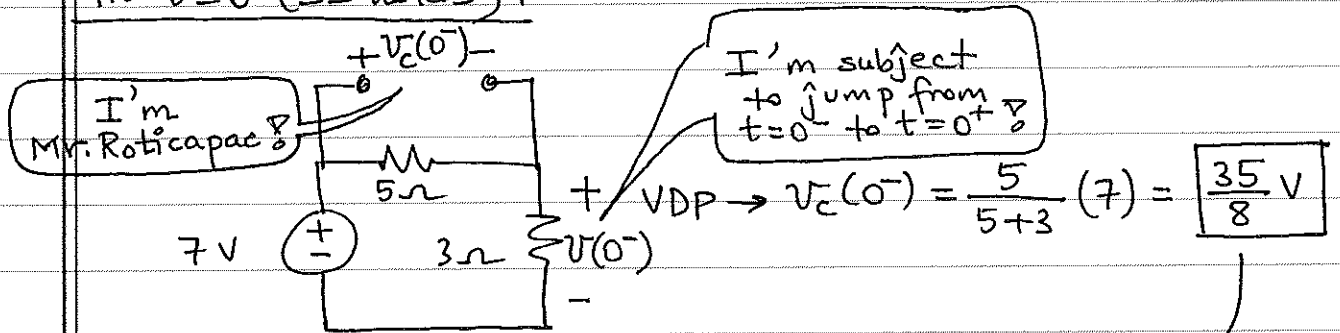
$$\therefore i_o(t) = -\frac{7}{5} e^{-50t/27} + \frac{6}{5} (1 - e^{-50t/27})$$

p. 360

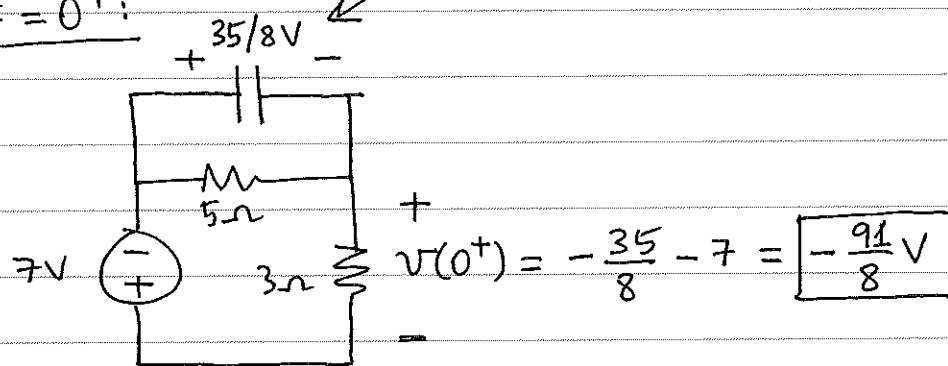
P 8.6-9



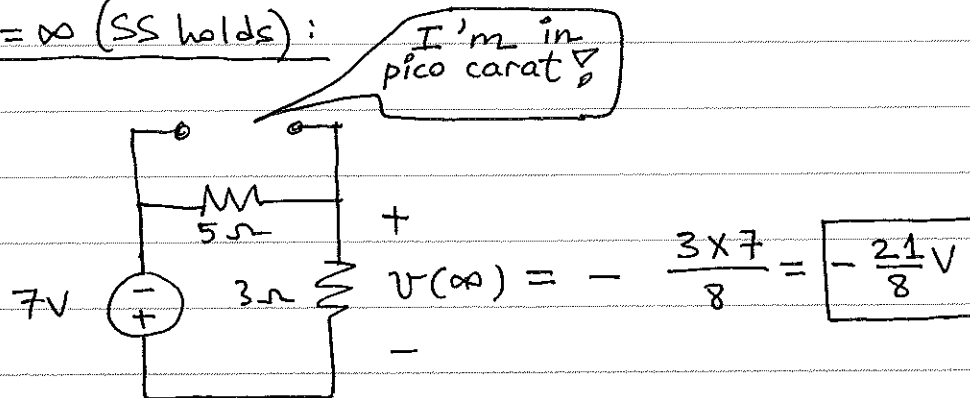
At  $t = 0^-$  (SS holds):



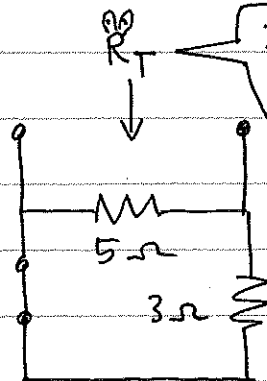
At  $t = 0^+$ :



At  $t = \infty$  (SS holds):



$\tau = R_T C$  where  $R_T$  can be found as follows:



I'm the equivalent resistor seen between the terminals of the energy storage element.

$$R_T = \frac{5 \times 3}{8} = \frac{15}{8} \Omega$$

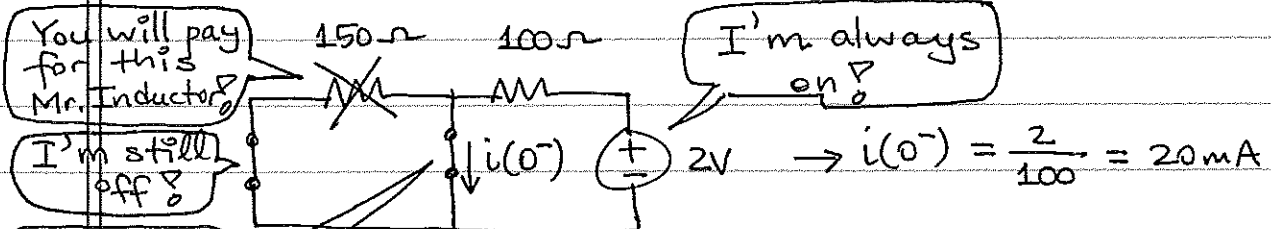
$$\tau = \frac{15}{8} (0.46) = \frac{345}{400} = \frac{69}{80}$$

$$\therefore v(t) = -\frac{91}{8} e^{-80t/69} + \left(-\frac{21}{8}\right) \left(1 - e^{-80t/69}\right)$$

p. 361

P 8.6-14

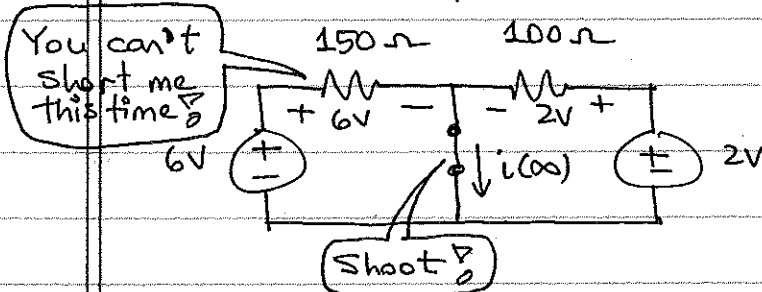
At  $t=0^-$  (SS holds):



$$\rightarrow i(0^-) = \frac{2}{100} = 20 \text{ mA}$$

Handwritten note: "Hey don't reveal my identity".  
 $\therefore i(0^+) = i(0^-) = \boxed{20 \text{ mA}}$

At  $t=\infty$  (SS holds):



$$\begin{aligned} \therefore i(\infty) &= \frac{6\text{V}}{150\Omega} + \frac{2\text{V}}{100\Omega} \\ &= 0.04 + 0.02 \\ &= \boxed{60 \text{ mA}} \end{aligned}$$

$$\tau = \frac{L}{R_T} = \frac{2}{150 // 100} = \frac{2(150+100)}{150 \times 100} = \frac{1}{30} \text{ sec}$$

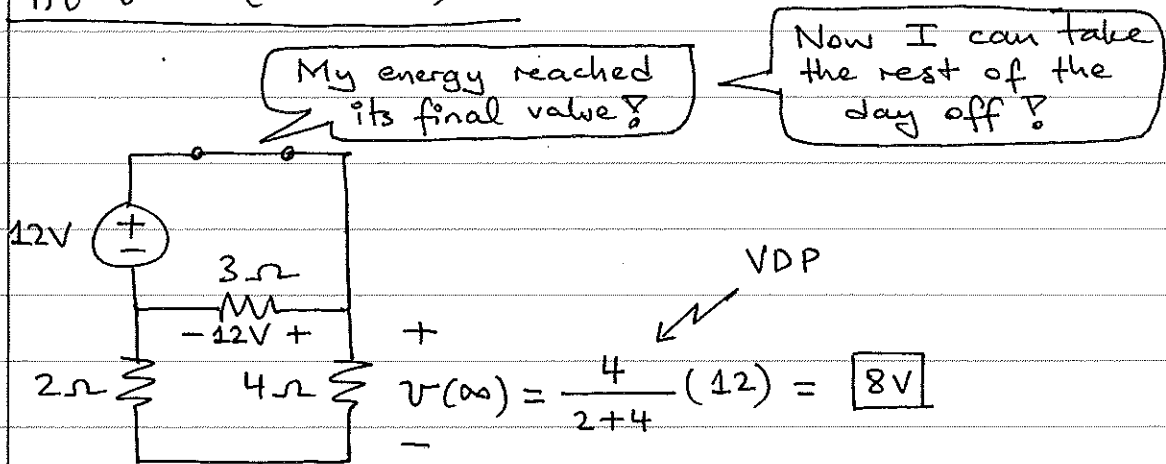
$$\therefore i(t) = \boxed{20 e^{-30t} + 60(1 - e^{-30t}) \text{ (mA)}}$$

P. 362

P 8.6-26

$v(0^+) = 0$ .  $\leftarrow$  No energy stored in the circuit to produce any voltage or current.

At  $t = \infty$  (SS holds) :



$$\tau = \frac{L}{R_T} = \frac{0.5}{3//6} = \frac{0.5}{2} = 0.25 \text{ sec}$$

$$\therefore v(t) = 8(1 - e^{-4t}) \text{ (V)}$$

— THE END —