

P1-30 1-6

$$R = \rho \times \frac{L}{\pi r^2}$$

$$= 1.723 \times 10^{-8} \times \frac{50}{\pi \left(\frac{1.03 \times 10^{-2}}{2} \right)^2}$$

$$= 0.4128 \Omega$$

P1-32 1-7

$$\frac{V_1 - 6}{3} + \frac{V_1}{6} + \frac{V_1 - V_2}{2} = 0$$

$$2V_1 - 12 + V_1 + 3V_1 - 3V_2 = 0$$

$$6V_1 - 3V_2 = 12 \Rightarrow 2V_1 - V_2 = 4 \quad \text{--- (1)}$$

$$\frac{V_1 - V_2}{2} = \frac{V_2 - 32}{8} + \frac{V_2}{8}$$

$$4V_1 - 4V_2 = V_2 - 32 + V_2$$

$$4V_1 - 6V_2 = -32 \Rightarrow 2V_1 - 3V_2 = -16$$

$$2V_2 = 20 \Rightarrow V_2 = 10(V)$$

$$V_1 = 7(V)$$

P1-60 1-18

$$V \times \frac{8}{8+4} = 5V \Rightarrow V = \frac{60}{8} V$$

$$I_2 = \frac{V}{20} = \frac{3}{8}$$

$$I_1 = \frac{5}{8} \quad I = I_1 + I_2 = 1A$$

19.

$$4 \times \frac{10}{10 + \frac{10}{3}} = 4 \times 10 \times \frac{3}{40}$$

$$= 3$$

$$I = 3 \times \frac{10}{15} = 2A$$

20.

$$I = \frac{V}{R} = \frac{54}{\frac{18}{9} + \frac{72}{18}}$$

$$= \frac{54}{6} = 9$$

$$9 \times \frac{6}{9} = 6 \quad 9 \times \frac{3}{9} = 3$$

$$6 - 3 = 3A$$

P1-35 1-11

D. $I = 0$
S 閉合後短路, $I = 0$.

1-12

$$a_{11} I_1 + a_{12} I_2 + a_{13} I_3 = 15$$

$$a_{21} I_1 + a_{22} I_2 + a_{23} I_3 = 10$$

$$a_{31} I_1 + a_{32} I_2 + a_{33} I_3 = -10$$

↓

$$(1+10+10)I_1 - 10I_2 - 10I_3 = 15 \Rightarrow a_{11} = 21$$

$$-10I_1 + (1+10+9)I_2 - I_3 = 10 \Rightarrow a_{22} = 20$$

$$-10I_1 - I_2 + (9+10+1)I_3 = -10 \Rightarrow a_{33} = 20$$

$$a_1 + a_2 + a_3 = 61$$

P1-52 1-15

$$V_0 = aV_1 + bV_2$$

開閉 $V_2 \Rightarrow V_{01} = V_1 \times \frac{2 \parallel (1+2)}{2 + (2 \parallel (1+2))} \times \frac{2}{1+2} = \frac{1}{4}$

$$\therefore V_1 \Rightarrow V_{02} = V_2 \times \frac{1 + (2 \parallel 2)}{2 + (1 + 2 \parallel 2)} = \frac{1}{2}$$

$$a + b = \frac{3}{4}$$

P1-71 1-22

$$75 = \frac{100 C_1}{C_1 + C_x}$$

$$\Rightarrow 75 C_x = 75 C_1$$

$$\Rightarrow C_x = \frac{1}{3} C_1 = 11 \mu F$$

1-23

$$Q_T = C_1 V_1 + C_2 V_2 = (C_1 + C_2) V$$

$$\Rightarrow V = \frac{C_1 V_1 + C_2 V_2}{C_1 + C_2}$$

$$= \frac{2 \times 1 + 1 \times 2}{2 + 1} = \frac{4}{3} V$$

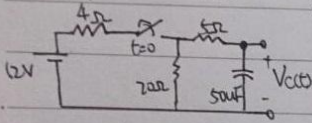
P1-82 1-27

(a) $T = RC = 30 \times 10^{-6}$
 $= 3 \times 10^{-5} (s)$
 $V_{c(t)} = V_{c0} \times e^{-t/RC} = 5 \times e^{-10^5 t/3}$

(a) C 的 $i(t) = ?$
 $i(t) = -\dot{v}_c(t) = -C \frac{dv_c(t)}{dt}$

(b) $t = 3 \times 10^{-5} = ?$
 $V_c(t = 3 \times 10^{-5}) = 5 \times e^{-\frac{10^5 \times (3 \times 10^{-5})}{3}}$
 $= 5 \times e^{-1} V$

P.1-95 1-30



step (1) $RC = 25 \times 50 \times 10^{-6} = 1.25 \times 10^{-3} (s)$

step (2) $t < 0 \Rightarrow$ 直流通, $C \Rightarrow$ 開

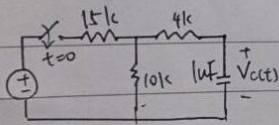
初 $V \Rightarrow V_c(t=0^-) = 12 \times \frac{20}{24} = 10V$

$V_c(t) = ?$

step III S 打開 $\Rightarrow V_c = 0$

Step IV $V_c(t) = (10 - 0) \times e^{-t/RC} + 0 = 10 \times e^{-800t}$

P.1-96 1-32



$\tau = R \cdot C = (15/10 + 4) \times 10^{-6}$ 初 $V_c = 0$
 $= 10^{-2}$

終 $V_c(t \rightarrow \infty) = 10 \times \frac{10}{15+10} = 16V$

$\Rightarrow V_c(t) = (0 - 16) e^{-t/RC} + 16 = 16(1 - e^{-100t}) V$