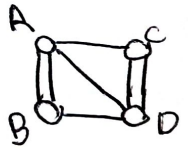
Capítulo 27 Folhas 00119110377 1/7

① 9S



② B: 7 | N: 4 | M: 4 | L: 6

③

$$\begin{bmatrix} A & -B & -C & -D \\ -B & E & -F & -G \\ -C & -F & H & -I \\ -D & -G & -I & J \end{bmatrix} \cdot \begin{bmatrix} I_1 \\ I_2 \\ I_3 \\ I_4 \end{bmatrix} = \begin{bmatrix} W \\ X \\ Y \\ Z \end{bmatrix}$$

$A = R_1 + R_2 + R_3$
$B = R_3$
$C = 0$
$D = 0$
$E = R_3 + R_4 + R_5 + R_6$
$F = R_4 + R_5$
$G = 0$
$H = R_4 + R_5 + R_7 + R_8$
$I = R_8$
$J = R_8 + R_9 + R_{10}$

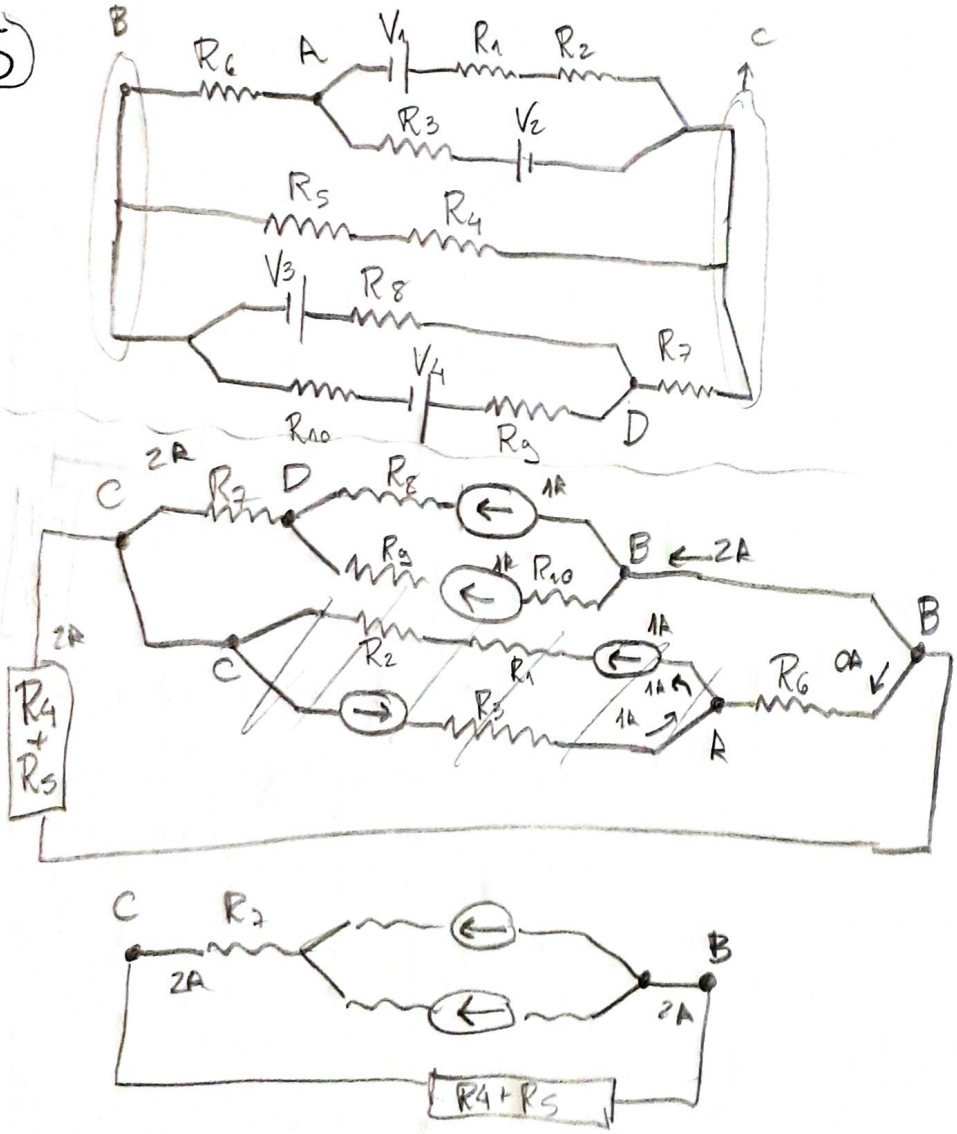
$W = V_1 + V_2 \parallel X = -V_2 \parallel Y = -V_3 \parallel Z = V_3 - V_4$

④ Fontes ~~Tensão~~ de 1V

Resistências de 1Ω

$$\begin{bmatrix} 3 & -1 & 0 & 0 \\ -1 & 4 & -2 & 0 \\ 0 & -2 & 4 & -1 \\ 0 & 0 & -1 & 3 \end{bmatrix} \cdot \begin{bmatrix} i_1 \\ i_2 \\ i_3 \\ i_4 \end{bmatrix} = \begin{bmatrix} 2 \\ -1 \\ -1 \\ 0 \end{bmatrix}$$

⑤



$$V_{CB} = \overset{\curvearrowright 2A}{I} \cdot (R_4 + R_5)$$

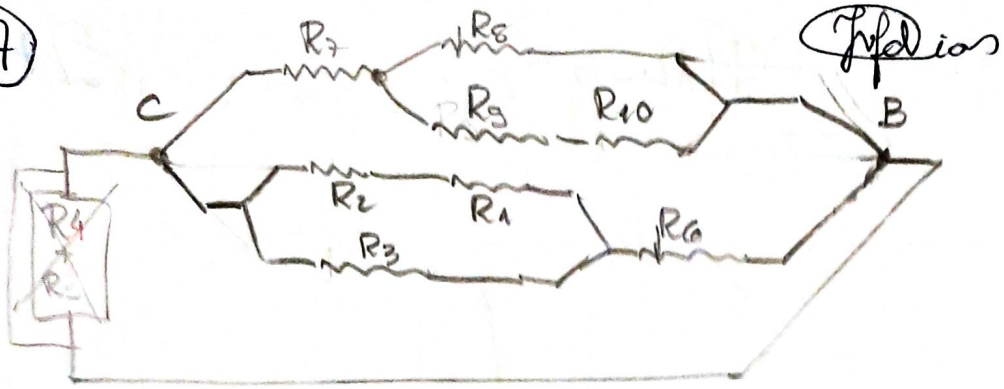
$$V_{CB} = 2 \cdot (1+1) = 4V$$

$$\boxed{V_{CB} = 4V}$$

(6) Folhas

como na questão 5 podemos ver que a corrente que sai do ponto B para o ponto A é 0, a tensão $V_{\vec{BA}}$ é 0 V.

(7)



Infelizes

$$\left\{\left[(R_1+R_2)\,//\,R_3\right]+R_6\right\}\,//\,\left\{R_7+\left[R_8\,//\,(R_9+R_{10})\right]\right\}$$

Todas resistências = 1Ω

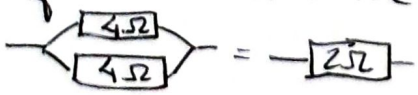
$$\left\{\left[(1+1)\,//\,1\right]+1\right\}\,//\,\left\{1+\left[1\,//\,(1+1)\right]\right\}$$

$$\left\{\left[2\,//\,1\right]+1\right\}\,//\,\left\{1+\left[1\,//\,2\right]\right\}$$

$$\left\{\left[2\cdot 1/(2+1)\right]+1\right\}\,//\,\left\{1+\left[1\cdot 2/(2+1)\right]\right\}$$

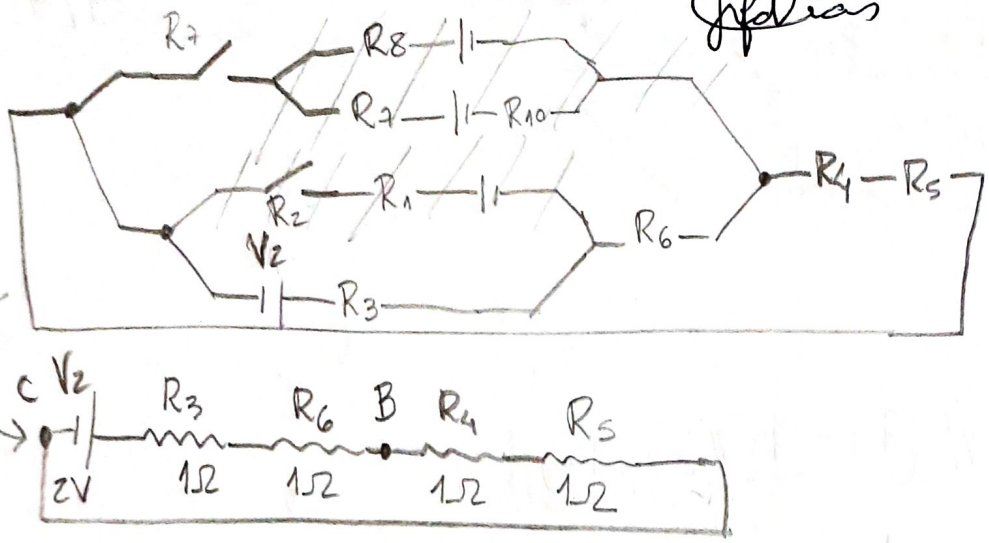
$$\left\{\frac{2}{3}+1\right\}\,//\,\left\{1+\frac{2}{3}\right\}$$

$$\frac{5}{3}\,//\,\frac{5}{3}$$

Resistências iguais em paralelo têm como Req metade de uma delas. Ex: 

$$Req = \left(\frac{5}{3}\right)\cdot\frac{1}{2} = \frac{5}{6}\,\Omega$$

(8)



$V_{CB} = V_2 - V_{R3} - V_{R6}$

$V_{R3} = R_3 \cdot (V_2 / (R_3 + R_4 + R_5 + R_6))$

$V_{R3} = 1 \cdot (2 / (1+1+1+1))$

$V_{R3} = 2/4 = 1/2 = 0{,}5\,V$

Como estão em série, a corrente que passa por R_3 é a mesma que passa por todos os outros.

$V_{R6} = R_6 \cdot I = 1 \cdot 0{,}5 = 0{,}5\,V$

$V_{CB} = V_2 - V_{R3} - V_{R6}$

$V_{CB} = 2 - 0{,}5 - 0{,}5 = 1\,V$

$\boxed{V_{CB} = 1\,V}$

① $R = \rho \cdot \frac{L}{A}$

$L = x$

$A = \pi R^2 =$

$D = 2R$

$R = \frac{D}{2}$

$A = \pi \cdot \left(\frac{D}{2}\right)^2$

$A = \frac{\pi D^2}{4}$

$D = 0,5x$

$A = \frac{\pi \cdot (0,5x)^2}{4}$

$A = \frac{\pi}{4} \cdot 0,25 \cdot x^2$

$A = \frac{\pi x^2}{16}$

$R = \rho \cdot x \cdot \frac{1}{\frac{\pi x^2}{16}}$

$R = \frac{\rho x \cdot 16}{x^2 \cdot \pi}$

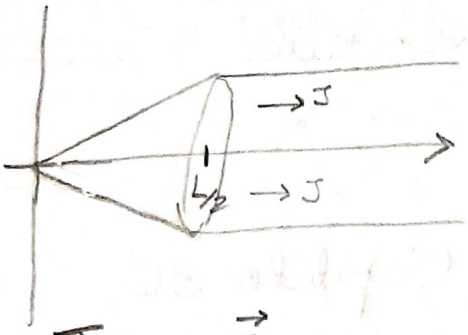
$R = \frac{\rho \cdot 16}{x \cdot \pi}$

$R = \rho \cdot 16 \cdot x^{-1} \cdot \pi^{-1}$

$R_{cone} = f(D_f, L, \rho_{mat}) = \rho_{mat} \cdot L \cdot \frac{1}{\frac{\pi}{16} \cdot D^2}$

$R_{cone} = f(0,5x, x, \rho_{mat})$

$R_{cone} = \rho \cdot 16 \cdot x^{-1} \pi^{-1}\ \Omega$

② 

$J = \sigma \cdot \vec{E}$

$\sigma = 1/\rho$

$R_{cone} = \rho \cdot 16 \cdot x^{-1} \pi^{-1}$

$\rho = \frac{R_{cone} \cdot x \cdot \pi}{16}$

$\sigma = 16 / R_{cone} \cdot x \cdot \pi$

$J = (16 / R_{cone} \cdot x \cdot \pi) \cdot \vec{E}$

$E = V/L = V/x$

$J = \frac{16}{R_{cone} \cdot x \cdot \pi} \cdot \frac{V}{x}$

$J = 16V \cdot (R_{cone} \cdot x^2 \cdot \pi)^{-1}$ $A/\Omega \cdot m \cdot m$

↳ densidade de corrente

$J = (\Omega \cdot m)^{-1} \cdot (C/m^2)$

$J = \Omega^{-1} \cdot m^{-1} \cdot A \cdot s^{-1} \cdot m^{-2}$

$J = \Omega^{-1} \cdot A \cdot s^{-1} \cdot m^{-3}$

$J = A/\Omega \cdot s \cdot m^3$

$\Omega = Kg \cdot m^2 \cdot s^{-3} \cdot A^{-2}$

0,5 Capítulo 25

① Folhas

② Perlei

$$C = \frac{Q}{V}$$

$$V = \frac{Q}{C}$$

$$V_1 = \frac{Q_0}{C_1} = \frac{1C}{1\mu F} = 10^6 V$$

$$V_1 \cdot C_2 = Q_1$$

$$10^6 \cdot 2 = Q_1$$

$$V_2 = \frac{Q_1}{C_2} = \frac{2 \cdot 10^6}{2} = 10^6 V$$

$$V_2 \cdot C_3 = Q_2$$

$$10^6 \cdot 3 = Q_2$$

$$V_3 = \frac{Q_2}{C_3} = \frac{3 \cdot 10^6}{3} = 10^6 V$$

$$V_3 \cdot C_4 = Q_3$$

$$10^6 \cdot 4 = Q_3$$

$$V_4 = \frac{Q_3}{C_4} = \frac{4}{4} = 10^6 V$$

$$V_4 \cdot C_5 = Q_4$$

$$10^6 \cdot 5 = Q_4$$

$$V_5 = \frac{Q_4}{C_5} = \frac{5}{5} = 10^6 V$$

$$\boxed{V_5 = 10^6 V}$$

Capítulo 30

① Sem Tempo

② Não existe

③ ⓐ Sem tempo

ⓑ Sem tempo