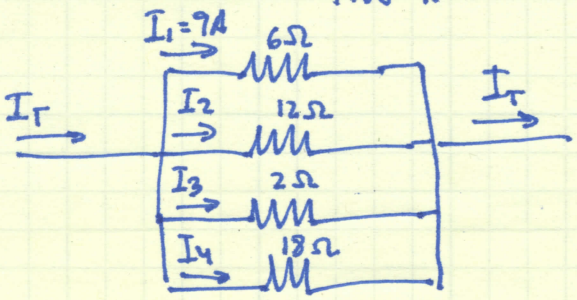
HW #7

6-30



V in each branch is the same

$V_{6\Omega} = V_{12\Omega}$

$I_1 \cdot R_6 = I_2 R_{12}$

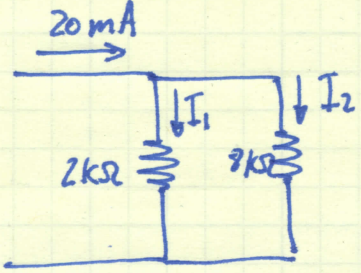
$$I_2 = I_1 \frac{R_6}{R_{12}} = I_1 \cdot \frac{6\Omega}{12\Omega} = 9A \cdot \frac{6\Omega}{12\Omega} = \boxed{4{,}5\,A = I_2}$$

$$I_3 = I_1 \frac{R_6}{R_2} = 9A \cdot \frac{6\Omega}{2\Omega} = \boxed{27A = I_3}$$

$$I_4 = I_1 \cdot \frac{R_6}{R_{18}} = 9A \cdot \frac{6\Omega}{18\Omega} = \boxed{3A = I_4}$$

$$I_T = I_1 + I_2 + I_3 + I_4 = 9A + 4{,}5A + 27A + 3A = \boxed{43{,}5\,A = I_T}$$

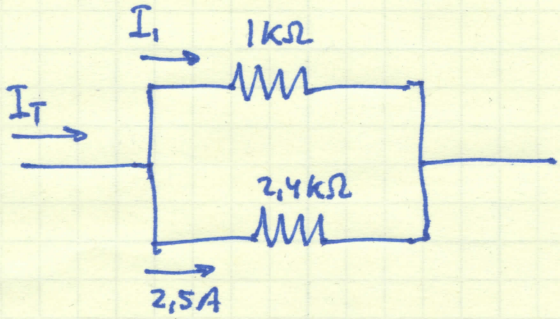
6-31



$$I_x = I_T \frac{R_2}{R_1 + R_2}$$

$$I_1 = 20\,mA \cdot \frac{8k\Omega}{2k\Omega + 8k\Omega} = \boxed{16\,mA = I_1}$$

$$I_2 = I_T - I_1 = 20\,mA - 16\,mA = \boxed{4\,mA = I_2}$$



$$I_x = I_T \cdot \frac{R_2}{R_1 + R_2}$$

$$2{,}5\,A = I_T \cdot \frac{1k\Omega}{1k\Omega + 2{,}4\,k\Omega} \quad \therefore \boxed{I_T = 8{,}5\,A}$$

$$I_1 = I_T - I_2 = 8{,}5A - 2{,}5\,A = \boxed{6A = I_1}$$

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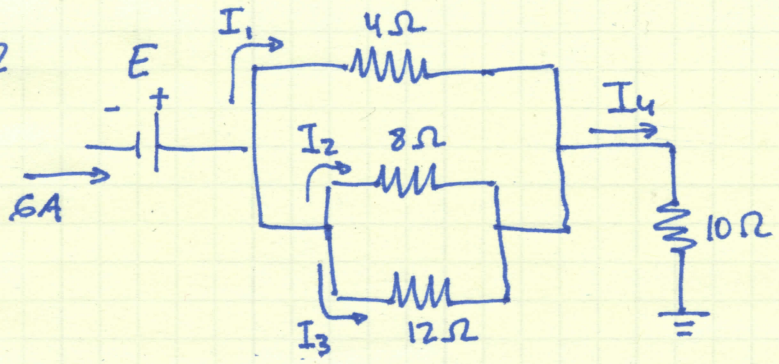
6-32



$$R_T = [4\Omega \parallel 8\Omega \parallel 12\Omega] + 10\Omega = \frac{1}{\frac{1}{4}+\frac{1}{8}+\frac{1}{12}} + 10 = 12{,}18$$

$$R_{eq} = 2{,}18\,\Omega$$

$$I_x = I_T \cdot \frac{R_{eq}}{R_x}$$

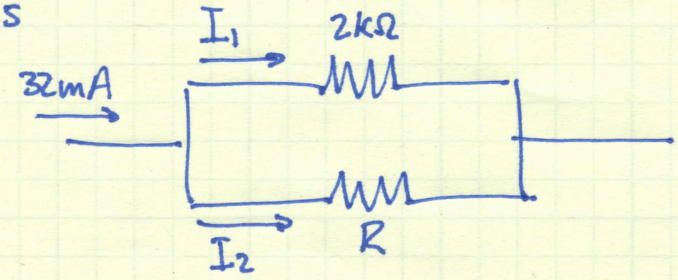
$$I_1 = 6A \cdot \frac{2{,}18\Omega}{4\Omega} = 3{,}27\,A$$

$$I_2 = 6A \cdot \frac{2{,}18\Omega}{8\Omega} = 1{,}64\,A$$

$$I_3 = 6A \cdot \frac{2{,}18\Omega}{12\Omega} = 1{,}09\,A$$

$$I_4 = I_T = 6A$$

6-35



$$I_1 = 3\,I_2$$

$$V_{2k\Omega} = V_R \quad \therefore \quad I_1 \cdot 2k\Omega = I_2 \cdot R$$

$$3\,I_2 \cdot 2k\Omega = I_2 \cdot R$$

$$R = \frac{3\,I_2 \cdot 2k\Omega}{I_2}$$

$$\boxed{R = 6k\Omega}$$

$$I_x = I_T \frac{R_2}{R_1 + R_2}$$

$$I_1 = 32\,mA \cdot \frac{6k\Omega}{2k\Omega + 6k\Omega} = \boxed{24\,mA = I_1}$$

$$I_2 = 32\,mA \cdot \frac{2k\Omega}{2k\Omega + 6k\Omega} = \boxed{8\,mA = I_2}$$

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