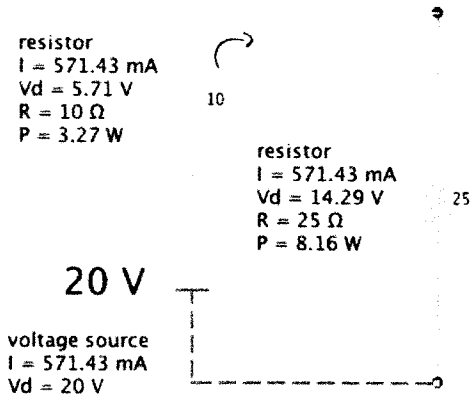
Engenharia, Física Elétrica – Leis de Kirchhoff
Prof. Simões

Calcule a corrente e os demais valores nos circuitos abaixo utilizando as resistências dadas e as tensões das fontes de energia. Os demais valores são as respostas:

1.



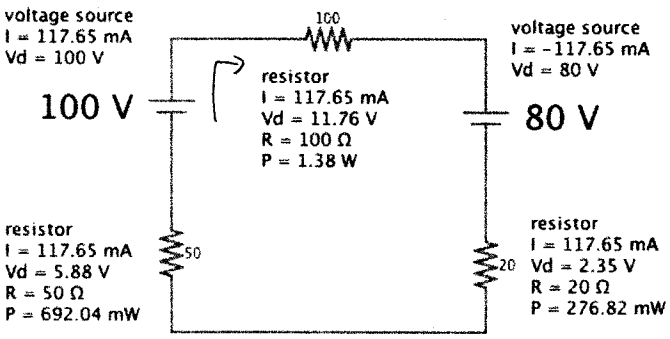
$20 - 10i - 25i = 0$

$20 - 35i = 0$

$20 = 35i$

$\frac{20}{35} = i \Rightarrow i = 0{,}57\ A$

2.

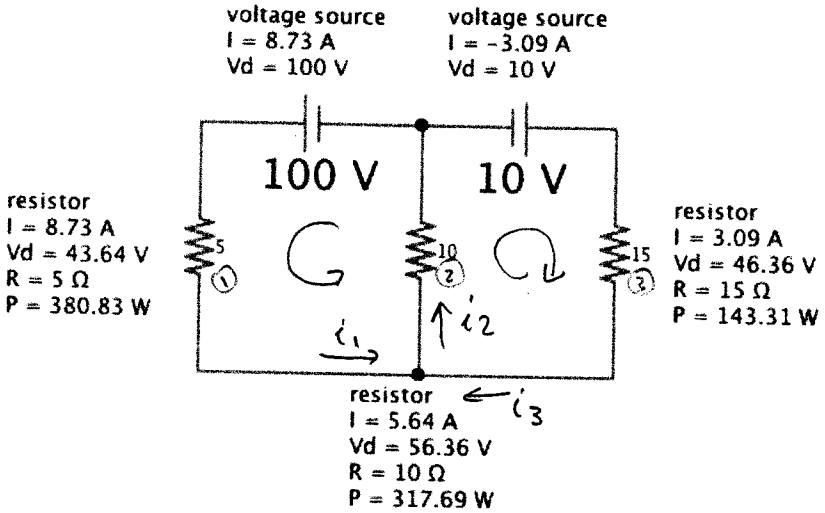


$100 - 100i - 80 - 20i - 50i = 0$

$20 - 170i = 0$

$20 = 170i \Rightarrow i = \frac{20}{170} \Rightarrow i = 0{,}12\ A$

3.



$i_2 = i_1 + i_3$ (1)

$100 - 5i_1 - 10i_2 = 0$

$100 = 5i_1 + 10i_2$

$20 = i_1 + 2i_2$ (2)

$10 - 15i_3 - 10i_2 = 0$

$10 = 15i_3 + 10i_2$

$2 = 3i_3 + 2i_2$ (3)

Resolvendo (1), (2) e (3)

$i_1 = 8,73$ A

$i_2 = 5,64$ A

$i_3 = -3,09$ A ∴ oposto ao des.

$V_1 = 5 \times 8,73 = 43,6$ V

$V_2 = 10 \times 5,64 = 56,4$ V

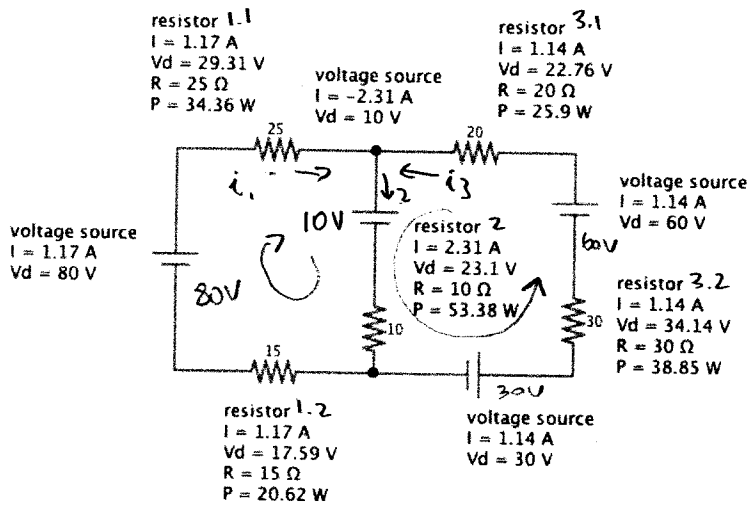
$V_3 = 15 \times 3,09 = 46,4$ V

$P_1 = 43,6 \times 8,73 = 381$ W

$P_2 = 56,4 \times 5,64 = 318$ W

$P_3 = 46,4 \times 3,09 = 143$ W

4.



$i_2 = i_1 + i_3$ (1)

$-10 - 10i_2 - 15i_1 + 80 - 25i_1 = 0$

$-10i_2 - 40i_1 = -70$

$i_2 + 4i_1 = 7$ (2)

$-10 - 10i_2 + 30 - 30i_3 + 60 - 20i_3 = 0$

$-10i_2 - 50i_3 = -80$

$i_2 + 5i_3 = 8$ (3)

Resolvendo (1), (2) e (3):

$i_1 = 1,17$ A

$i_2 = 2,31$ A

$i_3 = 1,14$ A

$V_{1.1} = 25 \times 1,17 = 29,3$ V

$V_{1.2} = 15 \times 1,17 = 15,6$ V

$V_2 = 10 \times 2,31 = 23,1$ V

$V_{3.1} = 20 \times 1,14 = 22,8$ V

$V_{3.2} = 30 \times 1,14 = 34,1$ V

$P_{1.1} = 29,3 \times 1,17 = 34,4$ W

$P_{1.2} = 15,6 \times 1,17 = 20,6$ W

$P_2 = 23,1 \times 2,31 = 53,4$ W

$P_{3.1} = 22,8 \times 1,14 = 25,9$ W

$P_{3.2} = 34,1 \times 1,14 = 38,9$ W