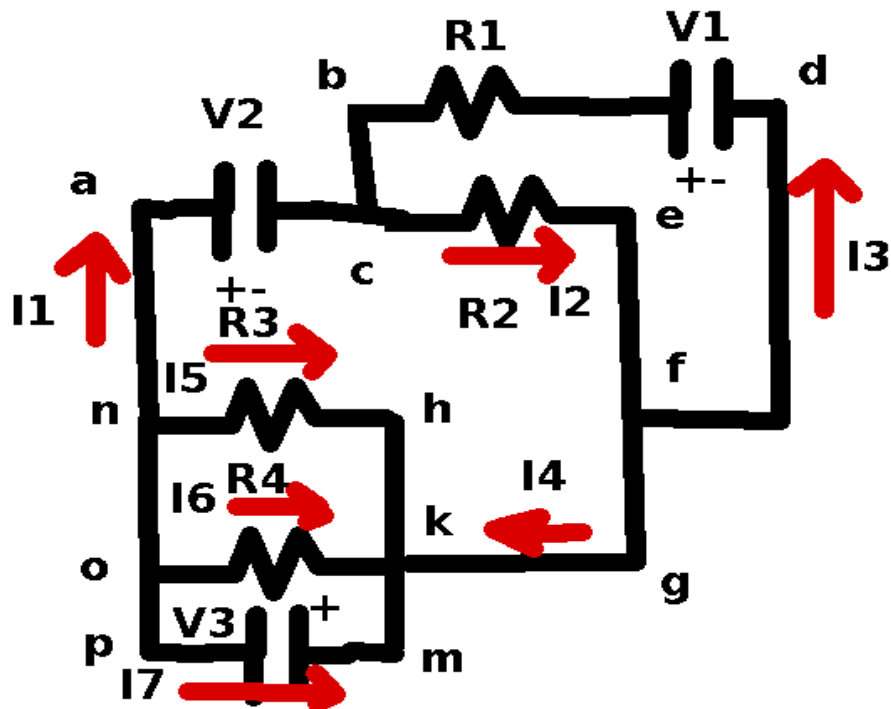


February 21, 2014: Physics 250: Unquiz 04



Provide the Kirchoff law results for the following:

(bcefdb):

(acefgkhna);

(nhkon):

(okmpo):

@c:

@k:

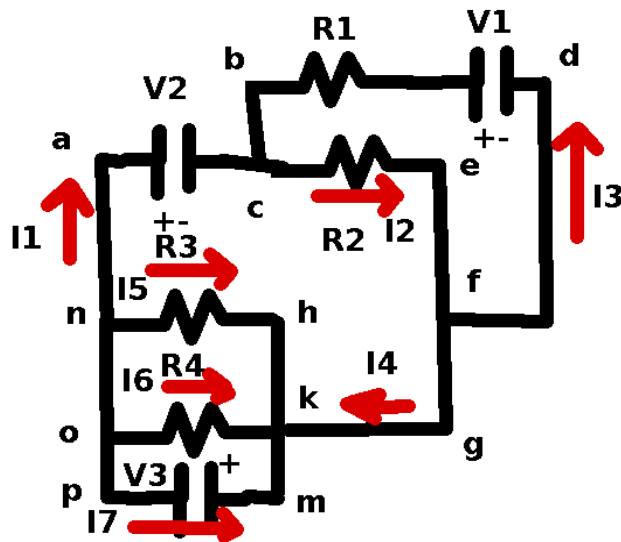
@f:

If $R_1=1, R_2=2, R_3=3, R_4=4, V_1=10, V_2=20, V_3=30$: the following currents result:

$I_1=-85, I_2=-25, I_3=60, I_4=-85, I_5=-10, I_6=-7.5, I_7=102.5$

Calculate the total power radiated by the circuit.

What is the interpretation of current I_5 ?



$$(bcefdb) : -I_2 R_2 + V_1 - I_3 R_1 = 0$$

$$(acefgkhna): -V_2 - I_2 R_2 + I_5 R_3 = 0$$

$$(nhkon): -I_5 R_3 + I_6 R_4 = 0$$

$$(okmpo): -I_6 R_4 - V_3 = 0$$

$$@c: I_1 - I_2 + I_3 = 0$$

$$@k: I_5 + I_6 + I_7 + I_4 = 0$$

$$@f: I_2 - I_3 - I_4 = 0$$

$$\text{If } R_1=1, R_2=2, R_3=3, R_4=4, V_1=10, V_2=20, V_3=30:$$

At the second linear equation solver link: enter:

$$-I_2 \cdot 2 + 10 - I_3 \cdot 1 = 0$$

$$-20 - I_2 \cdot 2 + I_5 \cdot 3 = 0$$

$$-I_5 \cdot 3 + I_6 \cdot 4 = 0$$

$$-I_6 \cdot 4 - 30 = 0$$

$$I_1 - I_2 + I_3 = 0$$

$$I_5 + I_6 + I_7 + I_4 = 0$$

$$I_2 - I_3 - I_4 = 0$$

$$\text{Obtain: } I_1 = -85, I_2 = -25, I_3 = 60, I_4 = -85, I_5 = -10, I_6 = -7.5, I_7 = 102.5$$

What is the total power radiated by the circuit?

$$P = I_3^2 R_1 + I_2^2 R_2 + I_5^2 R_3 + I_6^2 R_4 = 85^2 \cdot 1 + 25^2 \cdot 2 + 10^2 \cdot 3 + 7.5^2 \cdot 4$$

$$P = 7225 + 1250 + 300 + 225 = 9000 \text{ W}$$

What is the interpretation of current I_5 ?

It is in the direction opposite to that indicated by the arrow of I_5 in the diagram.