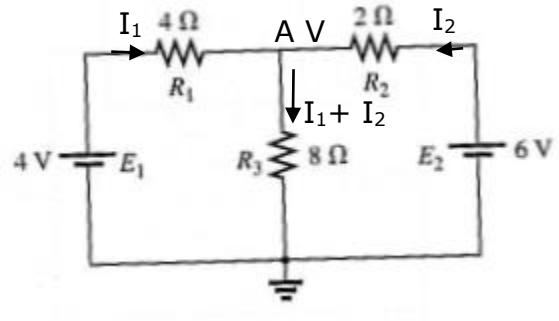
Q- Find current through all resistances in the given network.



Let the current in the loops are I_1 and I_2 as in the figure and the potential at node A be V.

Using Ohms law, we can write the equations for the current in the three resistors we get (the potential of the grounded portion is zero)

$E_1 - V = I_1 R_1$

Or $4 - V = I_1 * 4$

Or $I_1 = (4-V)/4$ ---------- (1)

$E_2 - V = I_2 R_2$

Or $6 - V = I_2 * 2$

Or $I_2 = (6-V)/2$ ---------- (2)

And

$V - 0 = (I_1 + I_2) R_3$

Or $V = 8\ I_1 + 8\ I_2$ ---------- (3)

Substituting the values of currents from equations 1 and 2 in equation 3 we get

$$V = 8 * \left[\frac{4-V}{4} + \frac{6-V}{2}\right]$$

Gives $V = 8 - 2V + 24 - 4V$

Or $V = 32/7$ volt

Substituting in equation 1 we get

$I_1 = 1 - (8/7) = -1/7$ A $= -0.143$ A

And from equation 2 we get

$I_2 = 3 - (16/7) = 5/7$ A $= 0.714$ A

And hence

$I_3 = I_1 + I_2 = -(1/7) + (5/7) = 4/7$ A $= 0.571$ A