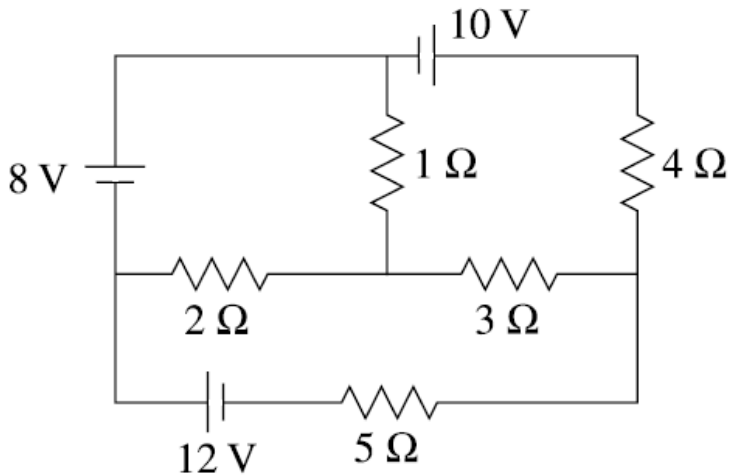


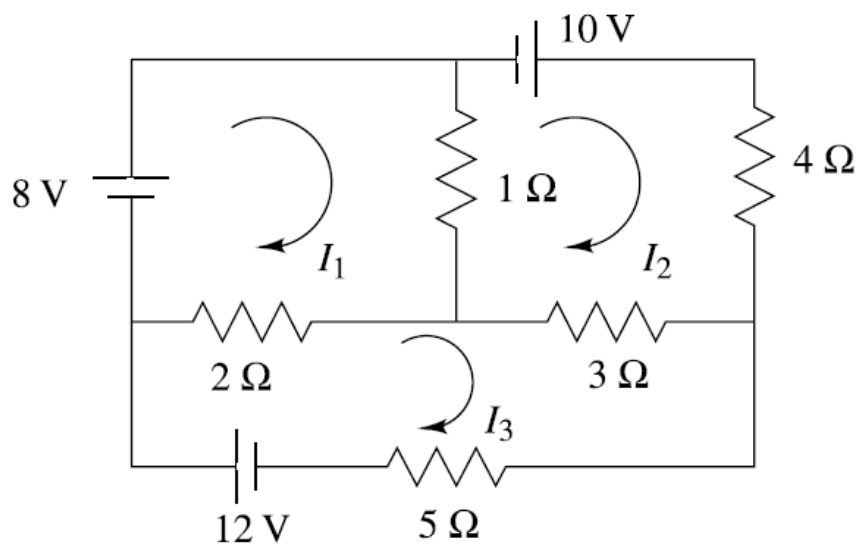
Unit I: Assessment: Q & A (Selected)

Lecture 10

2. Find the current through 5Ω resistor using Mesh Analysis.



SOLUTION:



Assigning Clockwise currents in each mesh

Unit I: Assessment: Q & A (Selected)

Applying KVL to Mesh 1,

$$\begin{aligned} 8 - 1(I_1 - I_2) - 2(I_1 - I_3) &= 0 \\ 3I_1 - I_2 - 2I_3 &= 8 \end{aligned} \quad \dots(i)$$

Applying KVL to Mesh 2,

$$\begin{aligned} 10 - 4I_2 - 3(I_2 - I_3) - 1(I_2 - I_1) &= 0 \\ -I_1 + 8I_2 - 3I_3 &= 10 \end{aligned} \quad \dots(ii)$$

Applying KVL to Mesh 3,

$$\begin{aligned} -2(I_3 - I_1) - 3(I_3 - I_2) - 5I_3 + 12 &= 0 \\ -2I_1 - 3I_2 + 10I_3 &= 12 \end{aligned} \quad \dots(iii)$$

Solving equations (i), (ii) and (iii),

$$I_1 = 6.01 \text{ A}$$

$$I_2 = 3.27 \text{ A}$$

$$I_3 = 3.38 \text{ A}$$

$$I_{5\Omega} = 3.38 \text{ A}$$