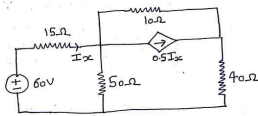


<< Search more Solutions!

Found Errors in Solution? >> [Report here!](#)

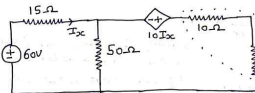
Answer

Q.1 Given Circuit Diagram is

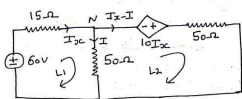


Here I_x current is flowing across 15Ω resistor which is controlling $0.5I_x$ current source. $\therefore I_x$ is controlling variable and we can not apply source transformation in controlling variable branch. Here source transformation is applicable in $0.5I_x$ branch \therefore current source is in parallel with resistor.

Now after applying source transformation our current source will change to voltage source $V = 0.5I_x \times 10 = 10I_x$.



\rightarrow Series connection $10\Omega + 40\Omega = 50\Omega$



let I current is flowing in 50Ω branch. By KCL at N $I_x = I$ we got.

Using KVL in Loop L_1 loop:

$$-60 + 15I_x + 50I = 0$$

$$50I + 15I_x = 60$$

$$10I + 3I_x = 12 \quad \text{--- (1)}$$

Multiplying (1) by 10

$$100I + 30I_x = 120 \quad \text{--- (2)}$$

$$70I_x = 120 \Rightarrow I_x = \frac{12}{7} A = 1.71 A$$

Using KVL in L_2 loop:

$$-50I - 10I_x + 50(I_x - I) = 0$$

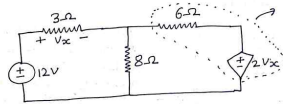
$$-50I - 10I_x + 50I_x - 50I = 0$$

$$40I_x - 100I = 0 \quad \text{--- (3)}$$

Now adding (2) + (3)

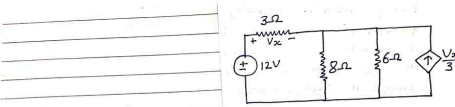
$$I_x = \frac{12}{7} A = 1.71 A$$

Q.2 Ans: Given Circuit Diagram is

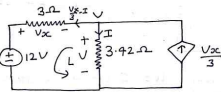


Using source transformation Here $\therefore 6\Omega$ is connected in series with $2V_x$ voltage source.

\therefore our current source will be $I = \frac{2V_x}{6} = \frac{V_x}{3}$



$$\text{Now } 8\Omega // 6\Omega = \frac{8 \times 6}{8+6} = \frac{48}{14} = 3.42\Omega$$



assuming I current and V voltage across 3.42Ω resistor.

By KCL current across 3Ω will be $\frac{V_x}{3} - I$

Using KVL in L_2 Loop:

$$-V - V_x + 12 = 0$$

$$V + V_x = 12$$

$$V = 12 - V_x \quad \text{--- (1)}$$

Using KCL at node V

$$\frac{V}{3.42} + \frac{V - 12 - V_x}{3} = 0$$

$$\frac{V}{3.42} + \frac{V - 12 - V_x}{3} = 0$$

$$3V + 3.42V - 41.04 - 3.42V_x = 0$$

$$6V - 3.42V_x = 41.04 \quad \text{--- (2)}$$

$$6(12 - V_x) - 3.42V_x = 41.04$$

$$72 - 6V_x - 3.42V_x = 41.04$$

$$-9.42V_x = -30.96 \Rightarrow V_x = 3.28 \text{ Volt}$$

Likes: 0

Dislikes: 0