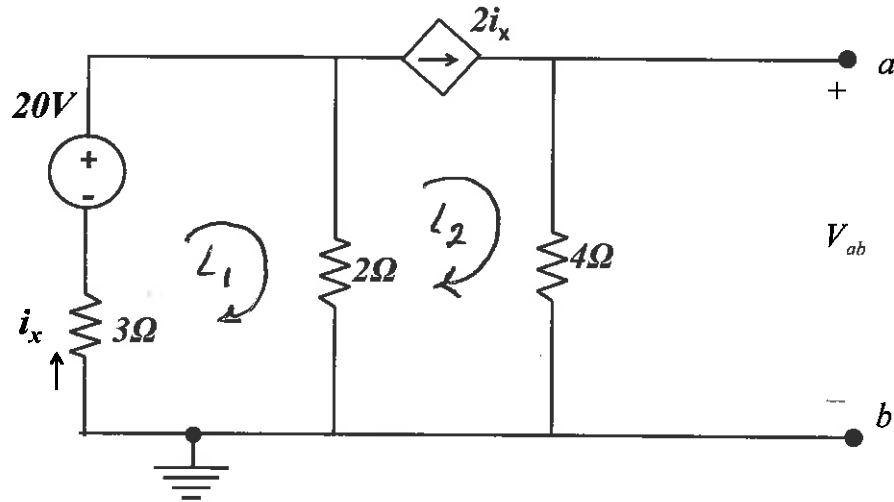


Problem # 2 (10 points)

Determine voltage at the terminals a-b using mesh analysis.



$$3I_1 - 20 + 2(I_1 - I_2) = 0 \Rightarrow 5I_1 - 2I_2 = 20$$

$$I_2 = 2I_x, \quad I_1 = I_x$$

$$\therefore 5I_x - 4I_x = 20, \quad I_x = 20 \text{ A} \Rightarrow I_2 = 40 \text{ A} \\ I_1 = 20 \text{ A}$$

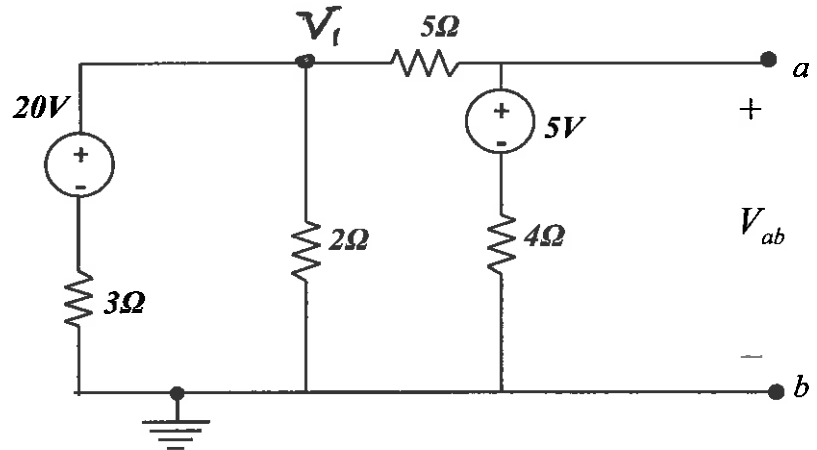
$$V_{ab} = I_2 \cdot 4 \Omega = 40 \text{ A} \cdot 4 \Omega = 160 \text{ V}$$

Name :

ID #

Problem # 1(10 Points)

Using nodal analysis, find the voltage at the terminals a-b.



$$\frac{V_1 - 20}{3\Omega} + \frac{V_1}{2\Omega} + \frac{V_1 - 5}{9\Omega} = 0$$

$$6V_1 - 120 + 9V_1 + 2V_1 - 10 = 0$$

$$17V_1 = 130, \quad V_1 = \frac{130}{17} \text{ V}$$

$$I_{5\Omega} = \frac{V_1 - 5}{9\Omega} = \frac{130/17 - 5}{9} = \frac{5}{17} \text{ A}$$

$$V_{ab} = 5 \text{ V} + 4\Omega \cdot I_{5\Omega} = 5 + 4 \times \frac{5}{17}$$

$$V_{ab} = \frac{105}{17} \text{ V}$$