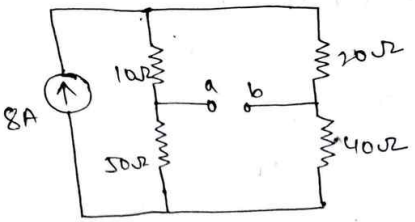
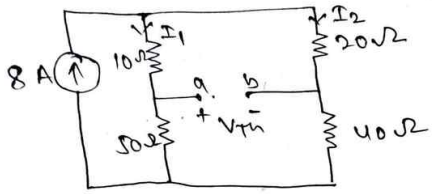
Answer

4.59



① Thevenin's equivalent



V_{Th} → Thevenin's equivalent voltage

$$I_1 = \frac{20+40}{20+40+10+50} \times 8 = \frac{60}{120} \times 8 = 4A$$

$$I_2 = \frac{10+50}{20+40+10+50} \times 8 = \frac{60}{120} \times 8 = 4A$$

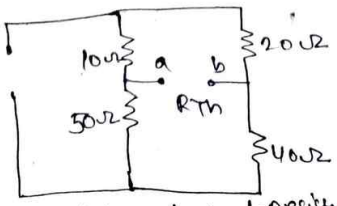
$\therefore$ $\boxed{V_{Th} = V_a - V_b}$

$V_a = 50 I_1 = 50 \times 4 = 200V$

$V_b = 40 I_2 = 40 \times 4 = 160V$

$\therefore V_{Th} = V_a - V_b = 200 - 160 = 40V$

$\boxed{V_{Th} = 40V}$



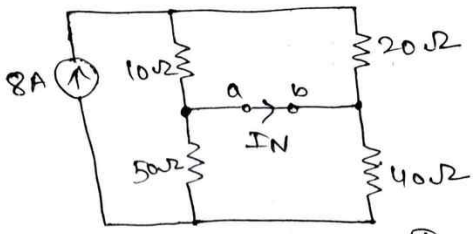
$R_{Th} = (10+20) \,||\, (40+50)$

$R_{Th} = 30 \,||\, 90$

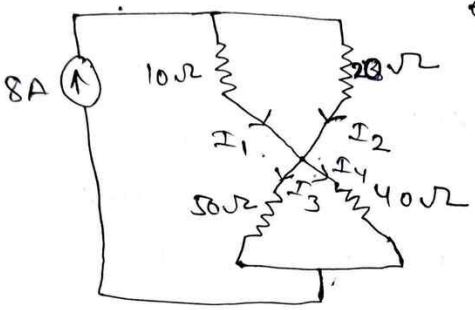
$R_{Th} = \frac{30 \times 90}{30+90} = 22.5\Omega$

R_{Th} → Thevenin's equivalent Resistance ← $\boxed{R_{Th} = 22.5\Omega}$

② Norton equivalent



I_N → Norton equivalent current

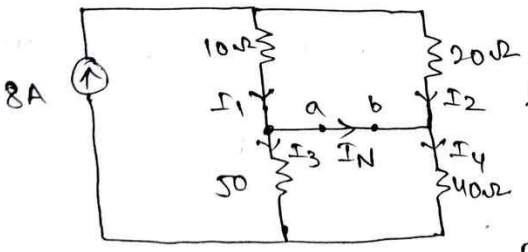


$I_1 = \frac{20}{30} \times 8 = \frac{16}{3} A$

$I_2 = \frac{10}{30} \times 8 = \frac{8}{3} A$

$I_3 = \frac{40}{90} \times 8 = \frac{32}{9} A$

$I_4 = \frac{50}{90} \times 8 = \frac{40}{9} A$



$I_N = I_1 - I_3$

$I_N = \frac{16}{3} - \frac{32}{9}$

$I_N = \frac{48-32}{9}$

$I_N = \frac{16}{9} = 1.77 A$

$R_N = \frac{V_{th}}{I_N} = \frac{40}{1.77} = 22.5 \Omega$

↳ Norton equivalent Resistance.

Likes: 0 **Dislikes: 0**