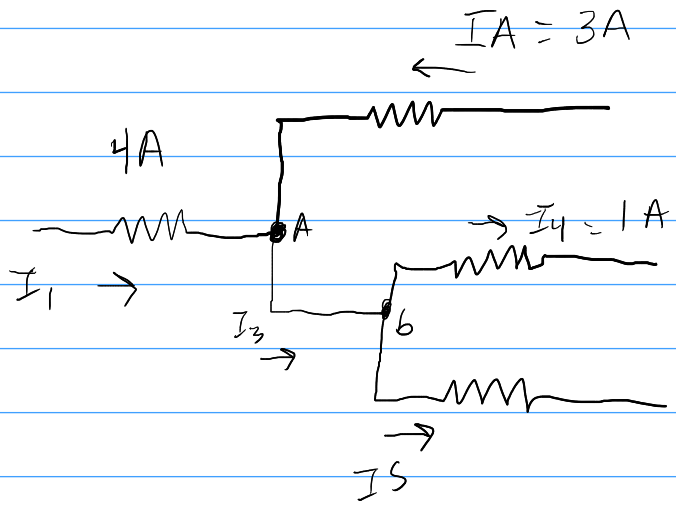
Kirchoff current Law (KCL)



Find I_3 & I_5

node a

$I_1 + I_2 = I_3$

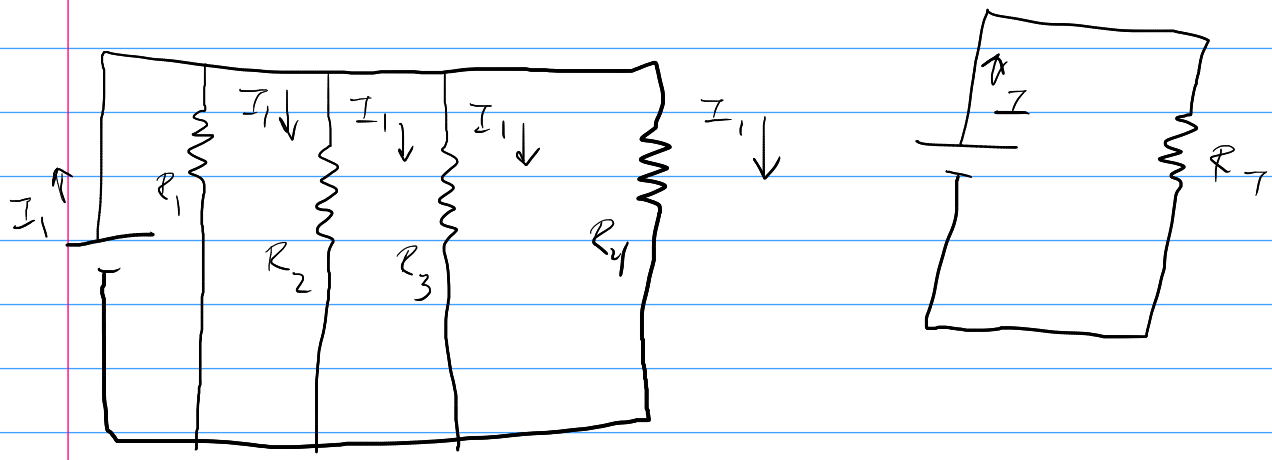
$I_3 = 4A + 3A = 7A$

At node b

$I_3 = I_4 + I_5$

$7 = 1 + I_5$ $\quad I_5 = 6mA$

Total Resistance – Parrallel



$$V_{R_1} = V_{R_2} = V_{R_3} = V_{R_4}$$

$$I = I_1 = I_2 = I_3 = I_4$$

$$I_1 = \frac{V_{R_1}}{R_1} = \frac{E}{R_1} \qquad I_2 = \frac{E}{R_2} \qquad I_3 = \frac{E}{R_3}$$

$$I_4 = \frac{E}{R_4}$$

$$E\frac{1}{R_T} = \frac{E}{R_T} = \frac{E}{R_1} = \frac{E}{R_2} = \frac{E}{R_3} = \frac{E}{R_4}$$

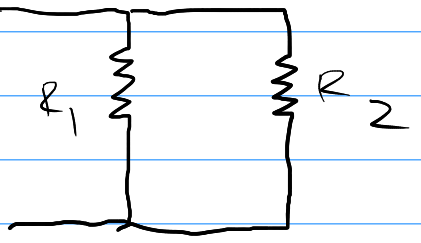
$$= \left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{R_4}\right)$$

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{R_4}$$

$$R_T = \frac{1}{R_1 + R_2 + R_3 + R_4}$$

for two resistors

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{R_2 + R_1}{R_1 R_2} \Rightarrow$$



$$\frac{1}{R_T} = \frac{R_2 + R_1}{R_1 R_2} \qquad R_T = \frac{R_1 R_2}{R_1 + R_2}$$

$$R_T = \frac{(6K)(7K)}{6K + 7K} = 2K$$