

(7)

Current Sources

in a branch

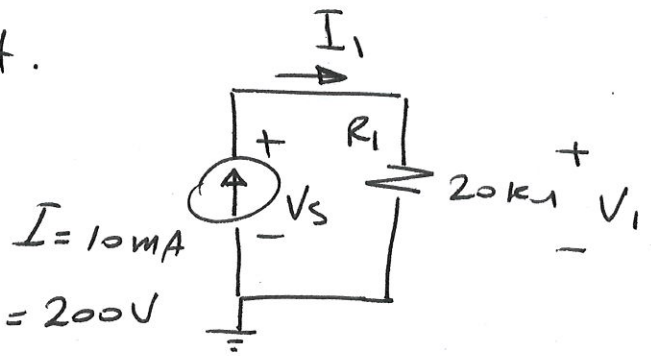
A current source determines the current in the branch in which it is located.

EX Find V_s & I_1 for the ckt.

SOL

$$I_1 = I = 10 \text{ mA}$$

$$V_s = V_1 = I_1 R_1 = (10 \text{ mA})(20 \text{ k}\Omega) = 200 \text{ V}$$

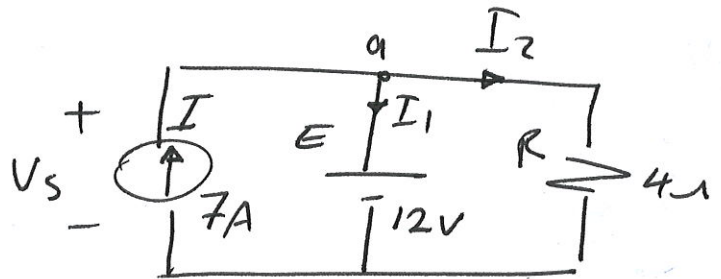


EX Find V_s , I_1 & I_2 for the network.

SOL

$$V_s = E = 12 \text{ V}$$

$$I_2 = \frac{E}{R} = \frac{12}{4} = 3 \text{ A}$$

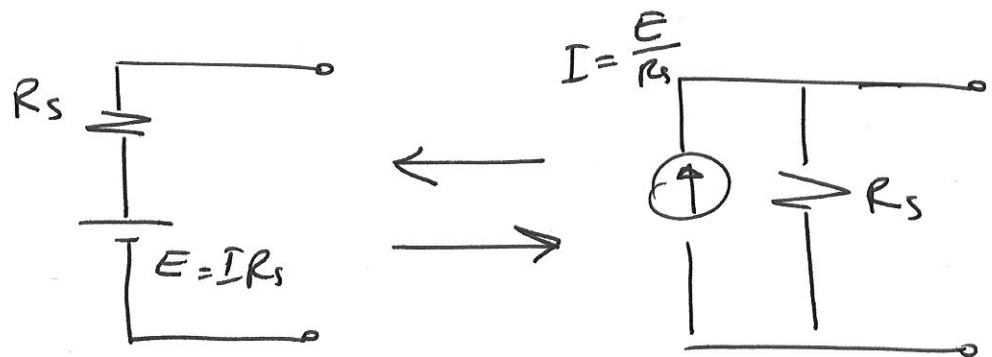


Applying KCL at node a ∴

$$I = I_1 + I_2$$

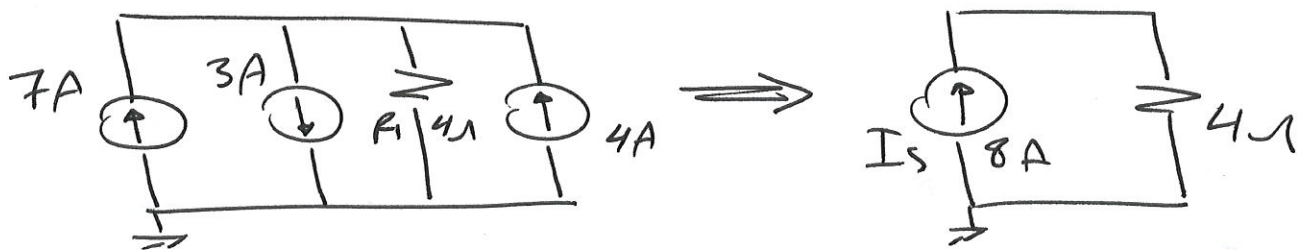
$$\therefore I_1 = I - I_2 = 7 - 3 = 4 \text{ A}$$

Source conversions



Current Sources in Parallel

حصار ليتا على لتوازي



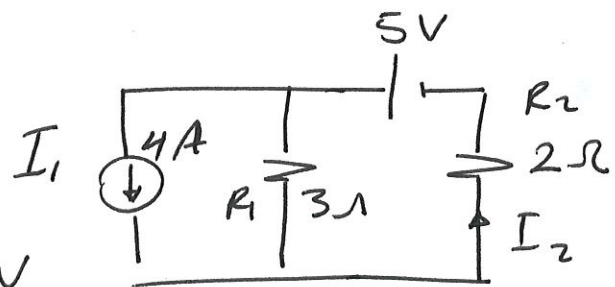
$$I_s = 7 + 4 - 3 = 8A$$

$$R_s = R_1 = 4\Omega$$

Ex Determine I_2 ?

Sol

$$E_s = I_1 R_1 = 4 \times 3 = 12V$$



$$I_2 = \frac{E_1 + E_s}{R_s + R_2} = \frac{12 + 5}{3 + 2} = 3.4A$$

