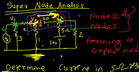


Determine current in 2Ω resistor

Writing voltage eqn for super node

$V_2 - V_3 = 20$ ——— ①

By applying KCL at node ①

$10 = \frac{V_1}{3} + \frac{V_1 - V_2}{2}$

$\left(\frac{1}{3}V_1 + \frac{1}{2}V_1\right) - \frac{1}{2}V_2 = 10$

$0.83V_1 - 0.5V_2 = 10$ ——— ②

Applying KCL at Supernode

$\frac{V_2 - V_1}{2} + \frac{V_2}{1} + \frac{V_3 - 10}{5} + \frac{V_3}{2} = 0$

$-0.5V_1 + 1.5V_2 + 0.7V_3 = 2$ ——— ③

Solving 1, 2 & 3

$V_1 = 19.04\ V$

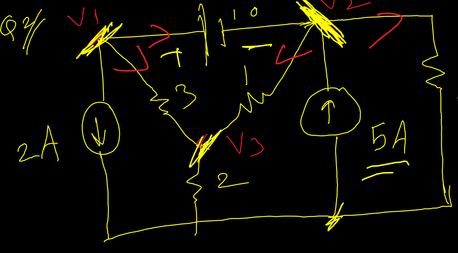
$V_2 = 11.6\ V$

$V_3 = -8.4\ V$

$I_3 = \frac{V_3 - 10}{5}$

$= \frac{-8.4 - 10}{5}$

$I_3 = -3.68\ A$

Q// 

Find Power delivered by 5A current source $P = VI$

Soln

Writing voltage eqn for supernode

$V_1 - V_2 = 10$ ——— ①

Applying KCL at supernode

$2 + \frac{V_1 - V_3}{3} + \frac{V_2 - V_3}{1} = 5$

$0.33V_1 + 1.2V_2 = 1.33V_3$ ——— ②

Applying KCL at node 3

$\frac{V_3 - V_1}{3} + \frac{V_3 - V_2}{1} + \frac{V_3}{2} = 0$

$-0.33V_1 - V_2 + 1.83V_3 = 0$ ——— ③

$V_1 = 13.72\ V$

$V_2 = 3.72\ V$

$V_3 = 4.51\ V$

Power delivered by 5A source

$= 5V_2$

$= 5 \times 3.72$

$P = 18.6$ watts.