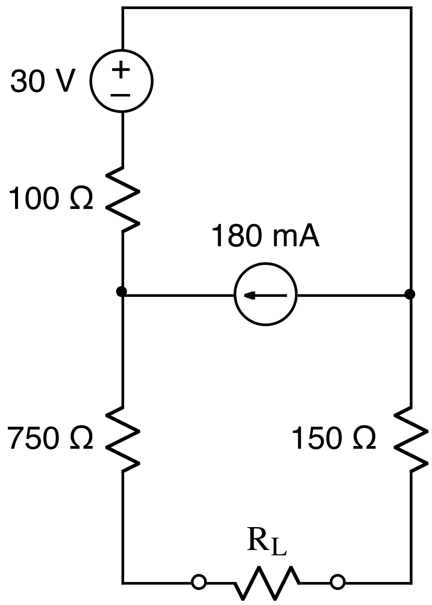
Ex:

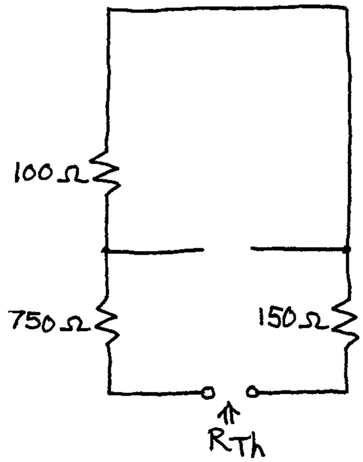


a) Calculate the value of R_L that would absorb maximum power.

b) Calculate that value of maximum power R_L could absorb.

Sol'n: a) $R_L = R_{Th}$ for max power transfer

We find R_{Th} by looking into the terminals where R_L is connected (but without R_L) with the two independent sources turned off.



$R_{Th} = 750\Omega + 100\Omega + 150\Omega$

$R_{Th} = 1k\Omega$

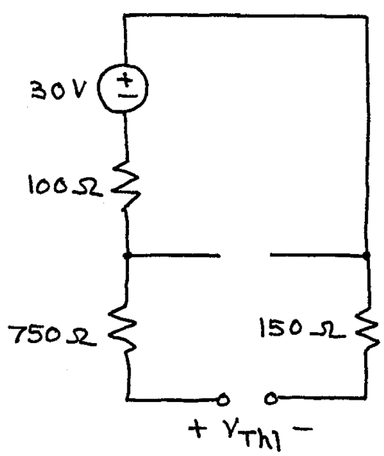
$\therefore$ $\boxed{R_L = 1k\Omega}$

b) $\text{max pwr} = \dfrac{\left(\frac{v_{Th}}{2}\right)^2}{R_{Th}}$

We find v_{Th} as the open circuit voltage across the terminals where R_L is connected.

We find v_{Th} by using superposition.

case I: 30 V on, 180 mA off

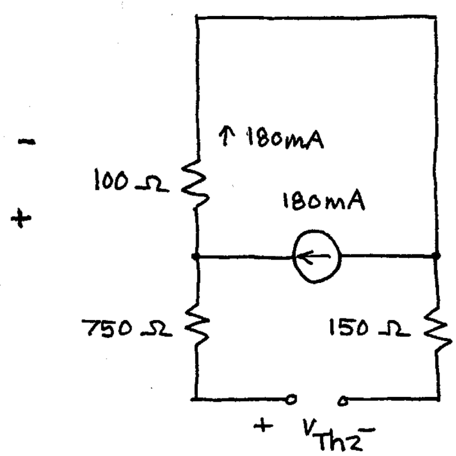


Since no current flows, there is no v-drop across the R's.

$\therefore v_{Th1} = -30\text{ V}$ (− v src)

Note: Since we will square v_{Th}, the polarity we choose for measuring v_{Th} doesn't matter.

case II: 30V off, 180 mA on



No current flows in the 750 Ω and 150 Ω. Thus, there is no v-drop across these R's.

The v-drop across the 100 Ω is equal to V_{Th2}.

$$V_{Th2} = 180\,mA \cdot 100\,\Omega = 18V$$

We sum results to find V_{Th}.

$$V_{Th} = V_{Th1} + V_{Th2}$$

$$V_{Th} = -30V + 18V = -12V$$

$$\text{max pwr} = \frac{\left(\frac{V_{Th}}{2}\right)^2}{R_{Th}} = \frac{6^2}{1k} = 36\,mW$$