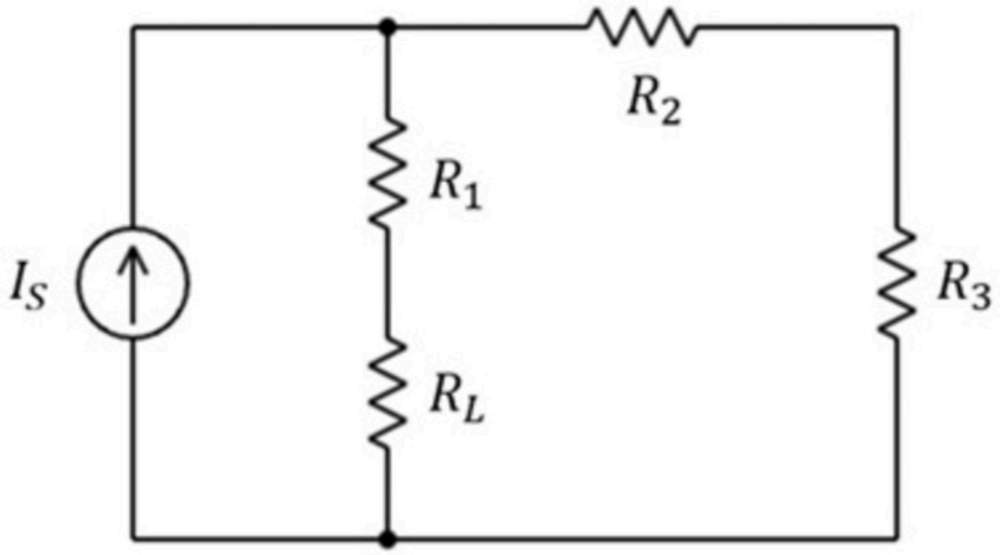
Circuit theorems 016

Problem has been graded.

Find the value of R_L such that the power received by R_L is maximized.

Find the corresponding max power received by R_L.



Given Variables:

Is : 2 A

R1 : 2 ohm

R2 : 1 ohm

R3 : 1 ohm

Calculate the following:

RL (ohm) :

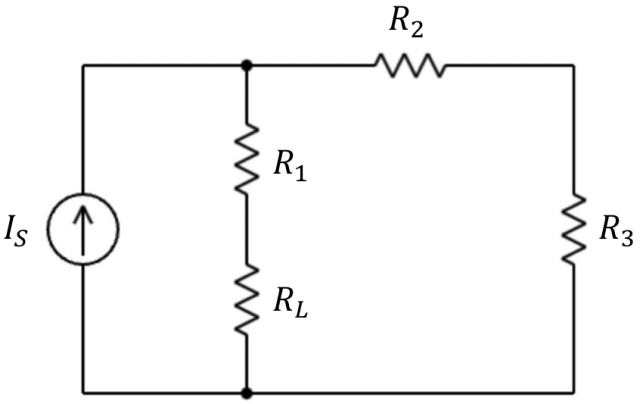
Pmax (W) :

> Hint: Find the Thevenin equivalent model of the circuit after taking out RL

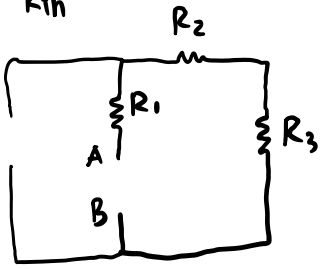
Find the value of R_L such that the power received by R_L is maximized.

Find the corresponding max power received by R_L.

$I_S = 2A$
$R_1 = 12\Omega$
$R_2 = 2\Omega$
$R_3 = 2\Omega$



Find R_{Th}



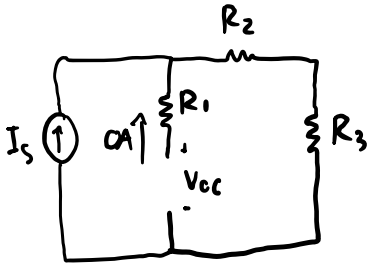
R_1, R_2, R_3 are in series

$R_{Th} = R_1 + R_2 + R_3$

$= 12 + 2 + 2$

$R_{Th} = 16\Omega$

Find V_{Th}



$V_{OC} = I_S \cdot (R_2 + R_3)$

$= 2 \cdot (2+2)$

$V_{OC} = 8V$

$$P_{max} = \frac{V_{Th}^2}{4R_{Th}}$$

$$= \frac{8^2}{4(16)}$$

$\boxed{P_{max} = 1\,W}$