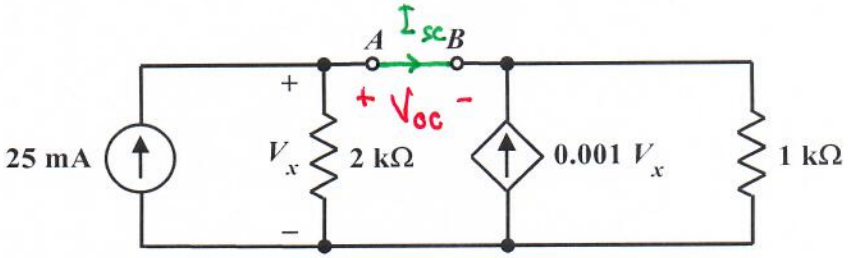
EE/EET 2240

Homework Problem #033



(a) Find the Thévenin equivalent circuit with respect to terminals A and B.

$$V_{oc} = (25mA)(2k\Omega) + 0.001\,(25mA)(2k\Omega)(1k\Omega)$$

$$= 50 + 50$$

$$= 100\ V \Rightarrow \boxed{V_T = 100V}$$

$$-25mA + \frac{V_x}{2k\Omega} - 0.001 V_x + \frac{V_x}{1k\Omega} = 0$$

$$\Rightarrow \frac{1}{2k\Omega} V_x = 25mA$$

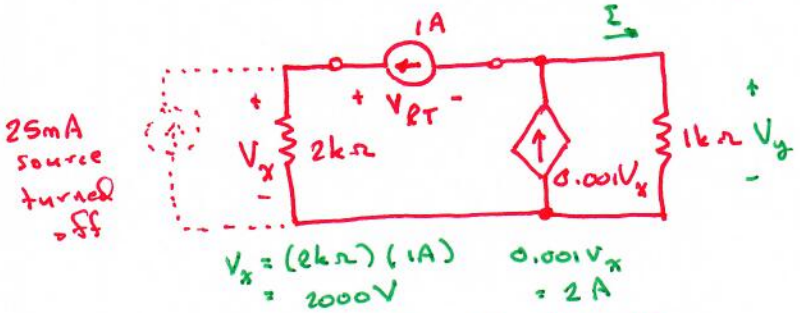
$$V_x = 50\ V$$

$$I_{sc} = 25mA - \frac{V_x}{2k\Omega} = 0\ A$$

$$R_T = \frac{V_{oc}}{I_{sc}} = \frac{0}{0} = ?$$

(b) If connected between terminals A and B, what value of R_L will absorb maximum power?

Alternate method to find R_T:



$V_x = (2k\Omega)(1A) = 2000V$ $\quad 0.001 V_x = 2A$

$I = 2A - 1A = 1A$

$V_y = (1k\Omega)\,I = 1000V$

$V_{RT} = V_x - V_y = 1000V$ $\Rightarrow$ $\boxed{R_T = 1k\Omega}$

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