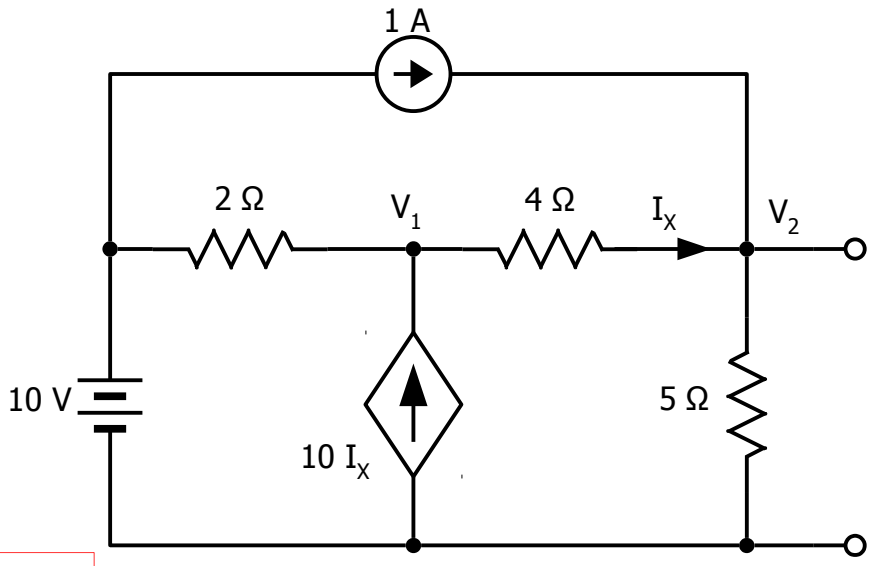
EE3 Fall 2021
Homework Problem 3

Find the Thévenin Equivalent of this circuit.



Method A Open Circuit Voltage:

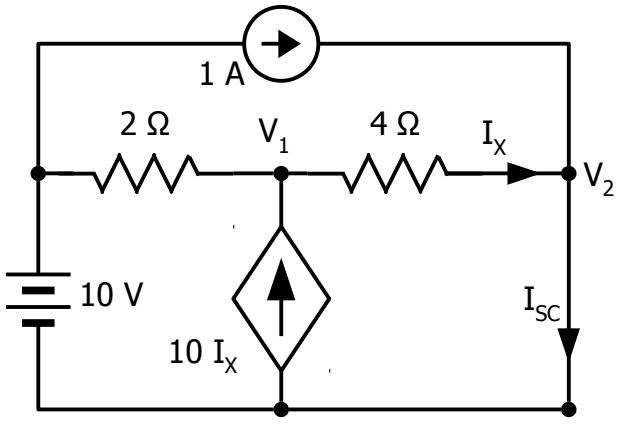
$$\frac{V_1-10}{2}-10I_X+\frac{V_1-V_2}{4}=0$$

$$\frac{V_2-V_1}{4}-1+\frac{V_2}{5}=0$$

$$I_X=\frac{V_1-V_2}{4}$$

$$V_{OC}=V_2=2.222\ \text{V}$$

Method A Short Circuit Current:



$$\frac{V_1-10}{2}-10I_X+\frac{V_1}{4}$$

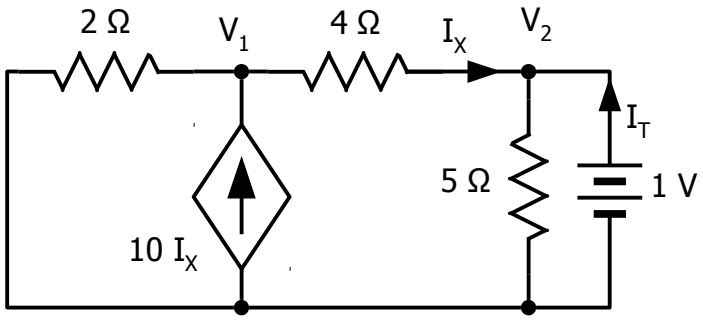
$$\frac{0-V_1}{4}+\frac{0}{5}+I_{SC}-1=0$$

¿ $$I_X=\frac{V_1-V_2}{4}$$

$$I_{SC}=0.2857$$

$$R_{th}=\frac{V_{OC}}{I_{SC}}=7.7778\,\Omega$$

Method B:



$$\frac{V_1}{2}-10I_X+\frac{V_1-1}{4}=0$$

$$\frac{1-V_1}{4}+\frac{1}{5}-I_T=0$$

$$I_X=\frac{V_1-1}{4}$$

$$I_T=0.1286\ \text{A}$$

$$R_{th}=\frac{1\ \text{V}}{0.1286\ \text{A}}=7.7778\,\Omega$$