

CECS 211 - LAB 5

Thevenin and Norton Equivalent Circuits

NAME:

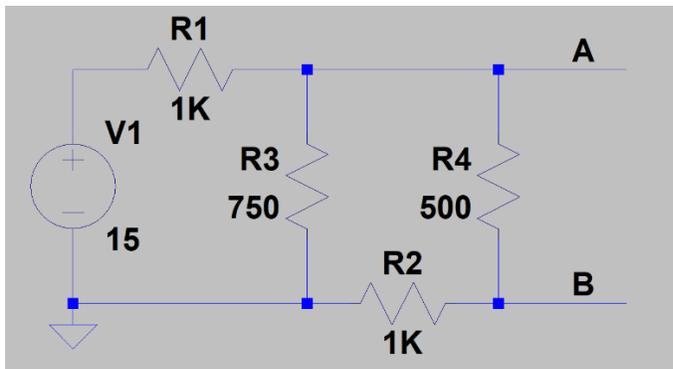
POSSIBLE POINTS: 10

STUDENT ID:

COURSE DATE & TIME:

DIRECTIONS:

We will be deriving the Thevenin and Norton equivalent circuit for the following circuit.



Step 1: Derive the Thevenin equivalent circuit for the above circuit. Draw the schematic and clearly label all values.

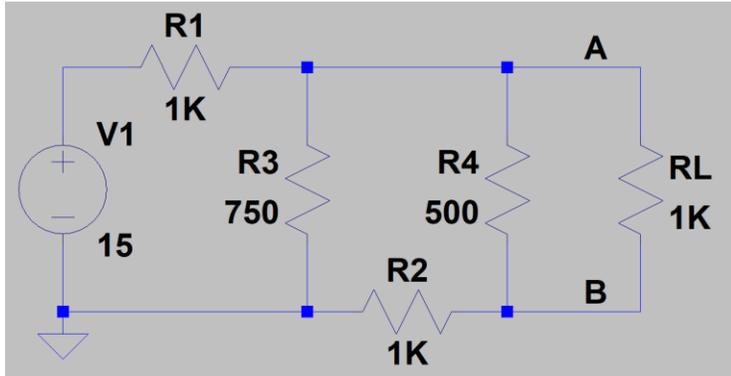
Step 2: Now draw the original circuit and add a load resistor R_L of 1K across the terminals A and B. We will use this load resistor as a test case. By verifying that V_{R_L} and I_{R_L} match both the original circuit and the new Thevenin equivalent circuit we can verify that indeed the two circuits are functionally identical. Solve this circuit and clearly label V_{R_L} and I_{R_L} . Fill in the table at the end of the writeup with the two values as well.

Step 3: Draw the Thevenin equivalent circuit with the added load resistor R_L of 1K across the terminals A and B. Calculate V_{R_L} and I_{R_L} , Show these clearly and also enter these values in the table at the end of the lab writeup.

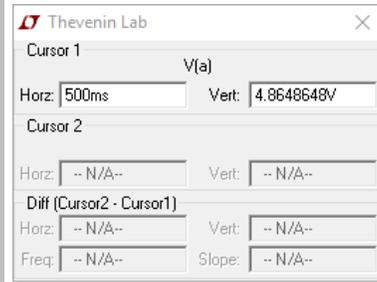
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Step 4: Now use LTspice to model the original circuit with the added load resistor R_L that we will use as a test case. Take a screenshot of the LTSpice model running with I_{RL} and V_{RL} clearly labeled on the waveform and include it with the lab writeup. Both the waveform and schematic should be visible in the screenshot and the values should be displayed using the cursor window. Enter the values in the table at the end of the writeup.



Circuit with test case (Load Resistor R_L)



Example of Cursor Window

Step 5: Derive the Norton equivalent circuit for the original circuit. Draw the schematic and clearly label all values.

Step 6: Draw the Norton equivalent circuit with the added load resistor R_L of 1K across the terminals A and B. Calculate V_{RL} and I_{RL} , Show these clearly and also enter these values in the table at the end of the lab writeup.

Step 7: Verify that all the values agree and that the original circuit, the Thevenin equivalent and the Norton equivalent all produce the same results with our test load.

	Hand Calculations		LTspice Model	
	Original Circuit	Thevenin	Original Circuit	Thevenin
V_{RL}				
I_{RL}				
	Original Circuit		Norton	
	Original Circuit	Norton	Original Circuit	Norton
V_{RL}				
I_{RL}				