



Faculty of Engineering and Technology
Electrical and Computer Engineering Department
Circuits LAB (ENEE2102)
Pre-LAB of Experiment #4
Network Theorems

Prepared by:

Name: Sara Totah

Number: 1181779

Instructor:

Jaser Sa'Ed

Date:

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Section: #1

Part A: Proportionality:

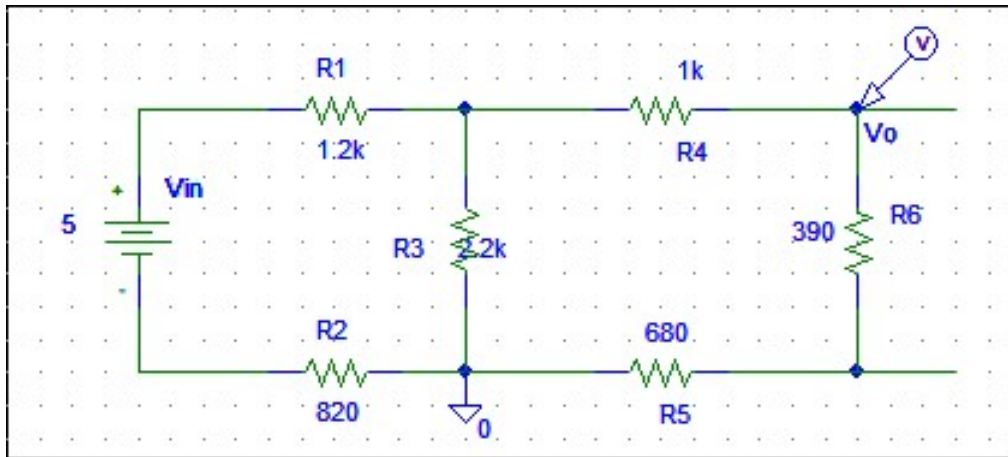
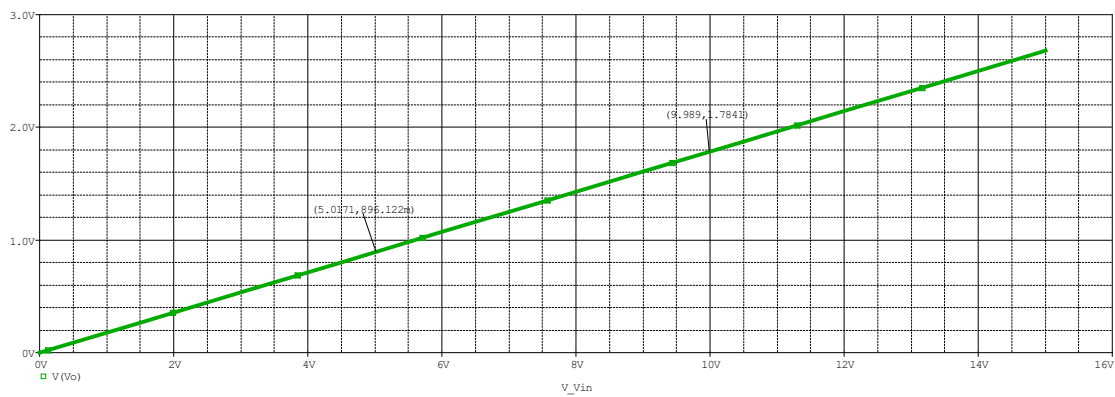


Fig (4-1)



Plot (4-1)

- When $V_{in} = 5$:
 $V_o = 896.122\text{mV}$.
- When $V_{in} = 10$:
 $V_o = 1.7841\text{V}$.

Part B: Superposition:

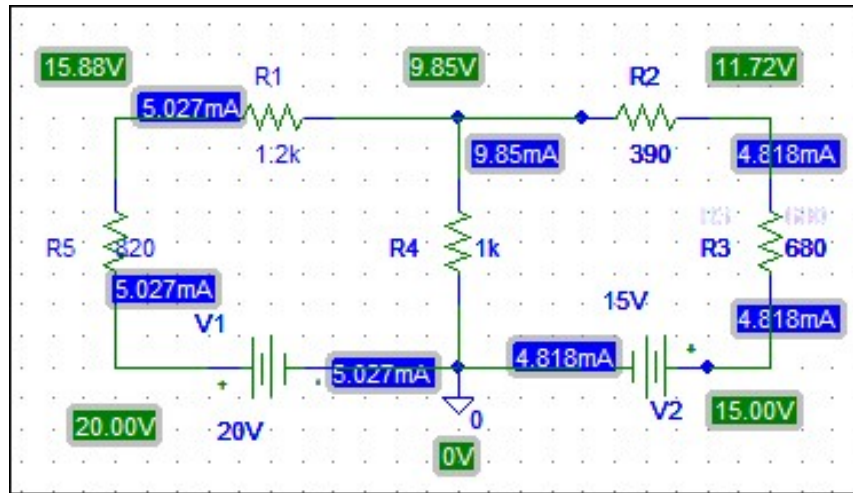


Fig (4-2)

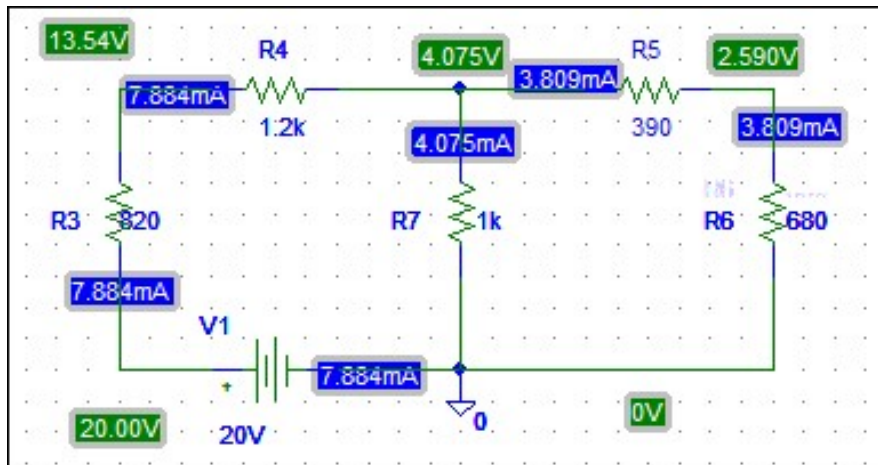


Fig (4-3)

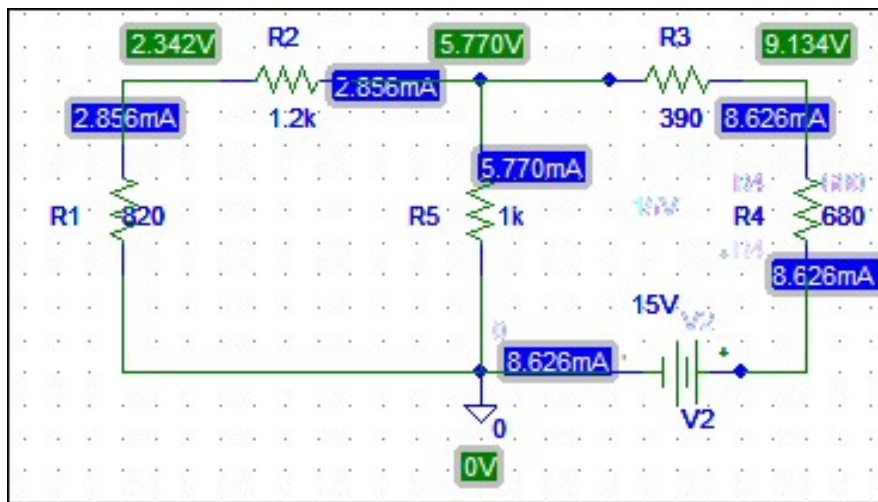


Fig (4-4)

Part C: Thevenin's Theorem:

A.

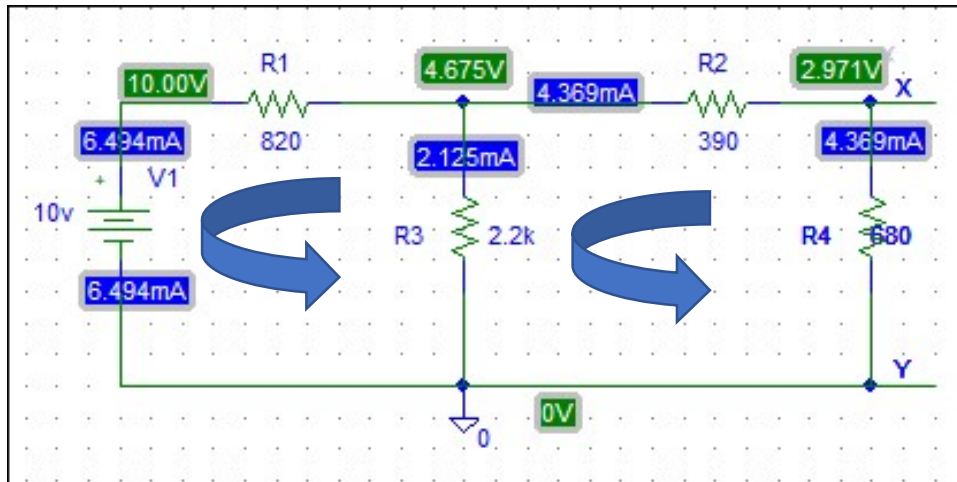


Fig (4-5) a

To find R_{th} remove R_4 and replace it with open circuit, and replace V_1 with short circuit:

$$R_{th} = (2.2k \parallel 820) + 390 = 987.35 \Omega$$

To find V_{th} replace R_4 with short circuit, with KCL:

$$V_{th} = 7.2v$$

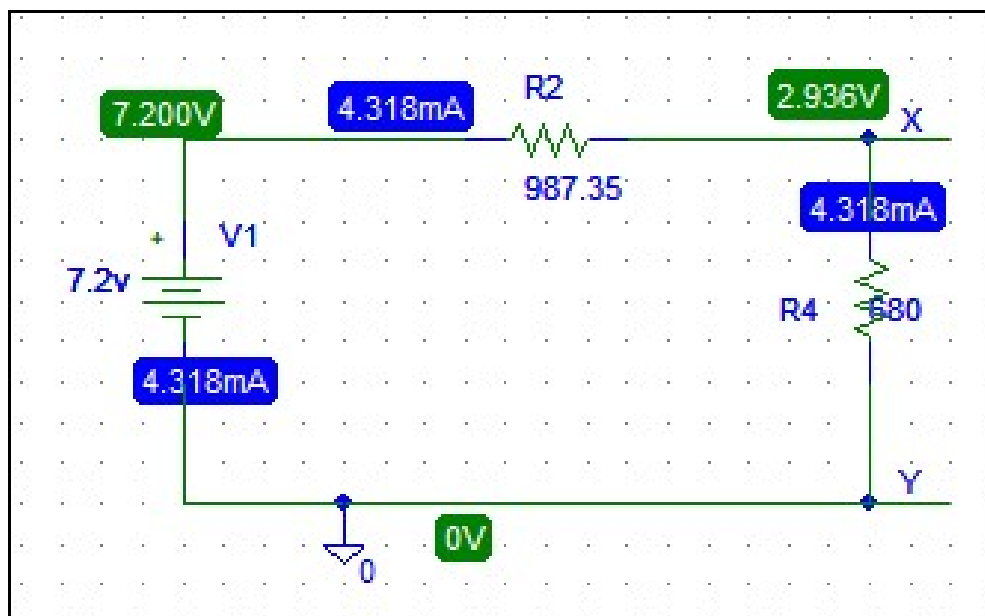


Fig (4-5) b

Part D: Δ-Y Transformation:

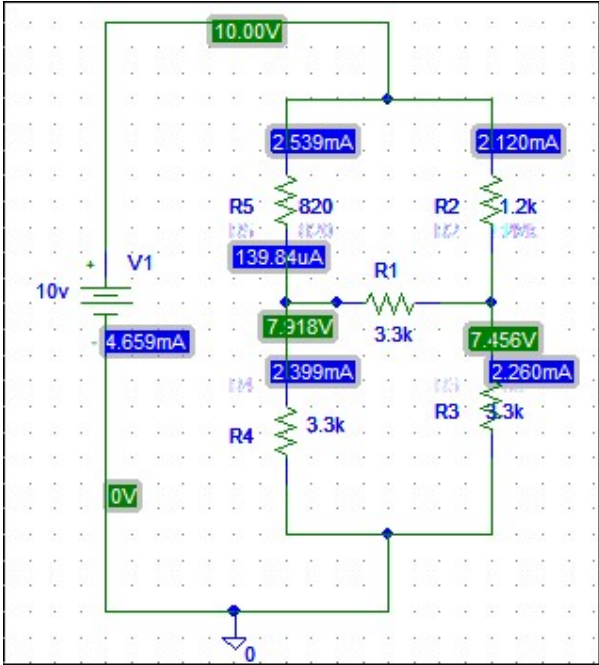
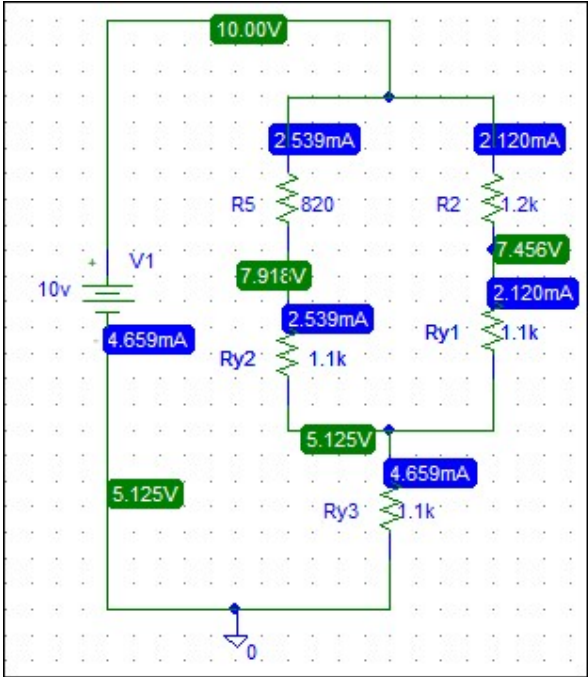


Fig (4-8) a

Y-Delta Transformation:

$$R_{y1} = R_{y2} = R_{y3} = \frac{3.3k}{3.3k \cdot 3} = 1100 \Omega$$



Y Transformation
Fig (4-8) b

Part E: The Reciprocity Theorem:

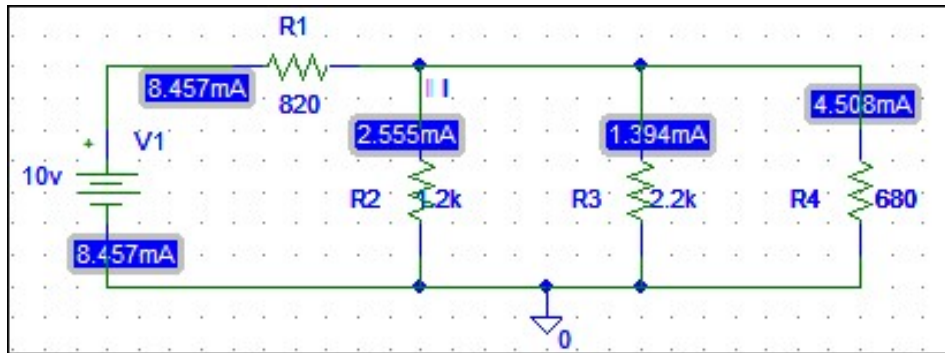


Fig (4-9)

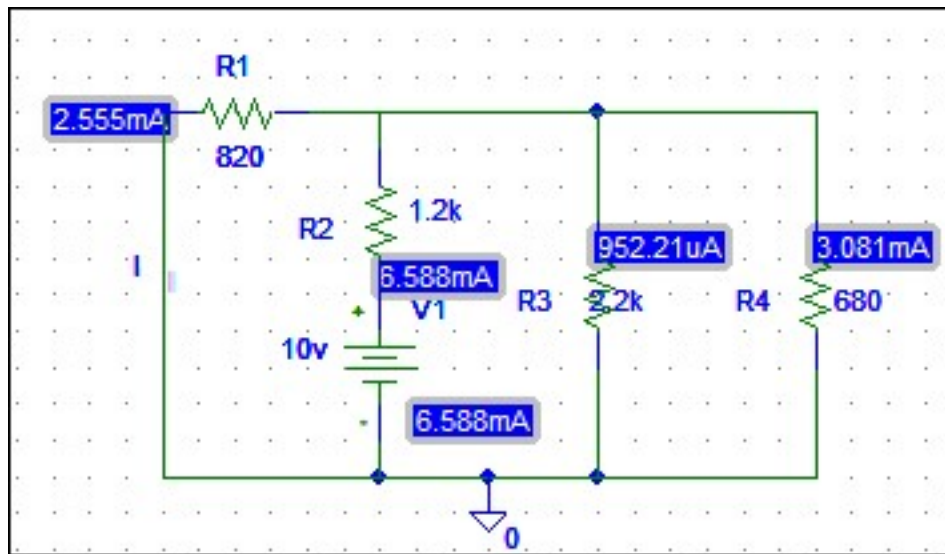


Fig (4-10)