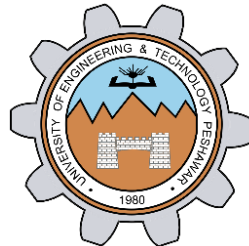


NORTON THEOREM

LAB # 11



Spring 2023

CSE103L Circuits & Systems-I Lab

Submitted by: **Naveed Ahmad**

Registration No: **22PWCSE2165**

Class Section: **B**

“On my honor, as student of University of Engineering and Technology, I have neither given nor received unauthorized assistance on this academic work.”

Student Signature: _____

Submitted to:

Dr. Muniba Ashfaq

Date: 13 June 2023

Department of Computer Systems Engineering
University of Engineering and Technology, Peshawar

TITLE:

Norton theorem.

Objective:

The objective of this lab is,

- To learn about Norton theorem.
- To solve the problem related to Norton theorem.
- To learn about R_n , I_n .

Definition:

Norton's theorem states that all linear circuits can be simplified to an equivalent circuit with a single current source in parallel with a single resistor connected to a load

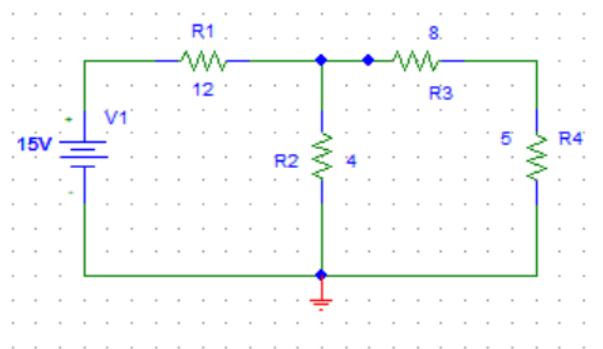
Difference between thevenin and Norton theorem:

Thevenin's Theorem utilizes a voltage source, while Norton's Theorem uses a current source. Norton's Theorem employs a resistor set in parallel over the source, whereas Thevenin's Theorem utilizes a resistor in series. From Thevenin's Theorem, Norton's Theorem can be easily derived.

Problem

To find the value of R_n , I_n .

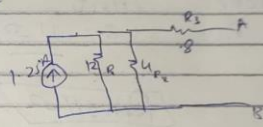
Diagram

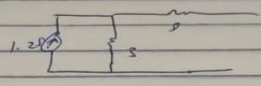
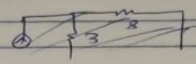
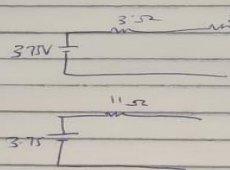


Solution:

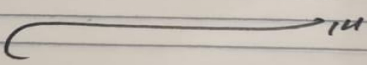
We solve this problem in notebook. First we find I_n and then R_n .

Lab Task:

$$I = \frac{V}{R} = \frac{15}{12} = 1.25 \text{ A}$$

$$R_{eq} = \frac{R_1 R_2}{R_1 + R_2} = \frac{4 \times 12}{4 + 12} = \frac{48}{16} = 3$$


$$V_{1R} = 1.25 \times 3 = 3.75 \text{ V}$$

$$R_{eq} = 3 + 8 = 11 \Omega$$
$$I = \frac{V}{R} = \frac{3.75}{11} = 0.34 \text{ A}$$

So

$$I_N = 0.34 \text{ A}$$


So we will get $I_N = 3.75 \text{ V}$ and $R_N = 11 \Omega$ which is proved in notebook.

Conclusion:

We solve the problem related to Norton theorem.

LAB RUBRICS: (Circuits & Systems-I Lab)

| Criteria & Point Assigned | Outstanding 4 | Acceptable 3 | Considerable 2 | Below Expectations 1 |
|--|---|---|---|--|
| Attendance and Attentiveness in Lab PLO10 | Attended in proper Time and attentive in Lab | Attended in proper Time but not attentive in Lab | Attended late but attentive in Lab | Attended late not attentive in Lab |
| Equipment / Instruments Selection and Operation PLO1, PLO2, PLO3, PLO5, | Right selection and operation of appropriate equipment and instruments to perform experiment. | Right selection of appropriate equipment and instruments to perform experiment but with minor issues in operation | Needs guidance for right selection of appropriate equipment and instruments to perform experiment and to overcome errors in operation | Cannot appropriately select and operate equipment and instruments to perform experiment. |
| Result or Output/ Completion of target in Lab PLO9, | 100% target has been completed and well formatted. | 75% target has been completed and well formatted. | 50% target has been completed but not well formatted. | None of the outputs are correct |
| Overall, Knowledge PLO10, | Demonstrates excellent knowledge of lab | Demonstrates good knowledge of lab | Has partial idea about the Lab and procedure followed | Has poor idea about the Lab and procedure followed |
| Attention to Lab Report PLO4, | Submission of Lab Report in Proper Time i.e. in next day of lab., with proper documentation. | Submission of Lab Report in proper time but not with proper documentation. | Late Submission with proper documentation. | Late Submission Very poor documentation |