**Experiment No-5**

Analyze and Implementation of Thevenin’s Theorem.

**OBJECTIVES:**

Verify Thevenin’s theorem theoretically and practically for a given circuit.

**APPARATUS:**

1. Resistors
2. DC Power Supply
3. Digital Multimeter (DMM)
4. Connecting wires

**Theory:**

**Thevenin’s Theorem:**

Any linear, bilateral network having a number of voltage, current sources and resistances can be replaced by a simple equivalent circuit consisting of a single voltage source in series with a resistance, where the value of the voltage source is equal to the open circuit voltage and the resistance is the equivalent resistance measured between the open circuit terminals with all energy sources replaced (open the current source and short the voltage source).

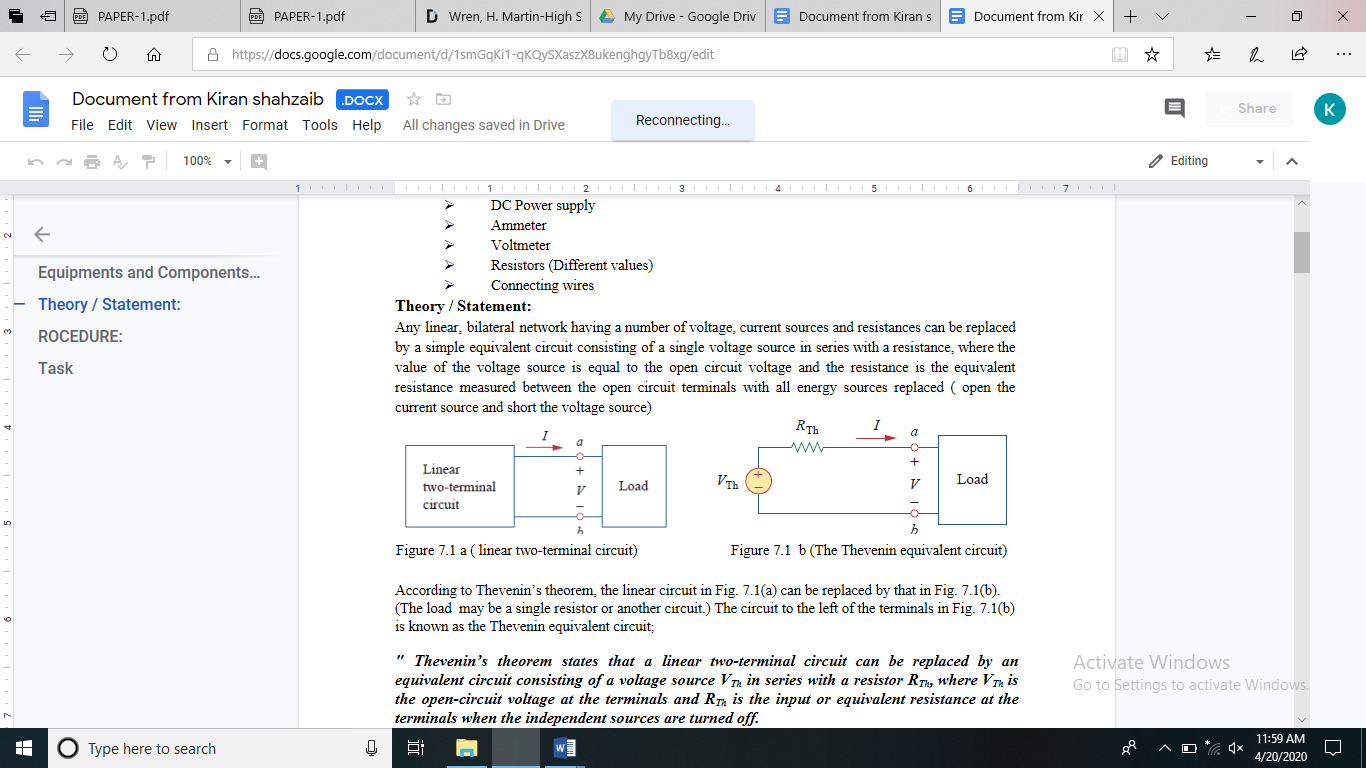
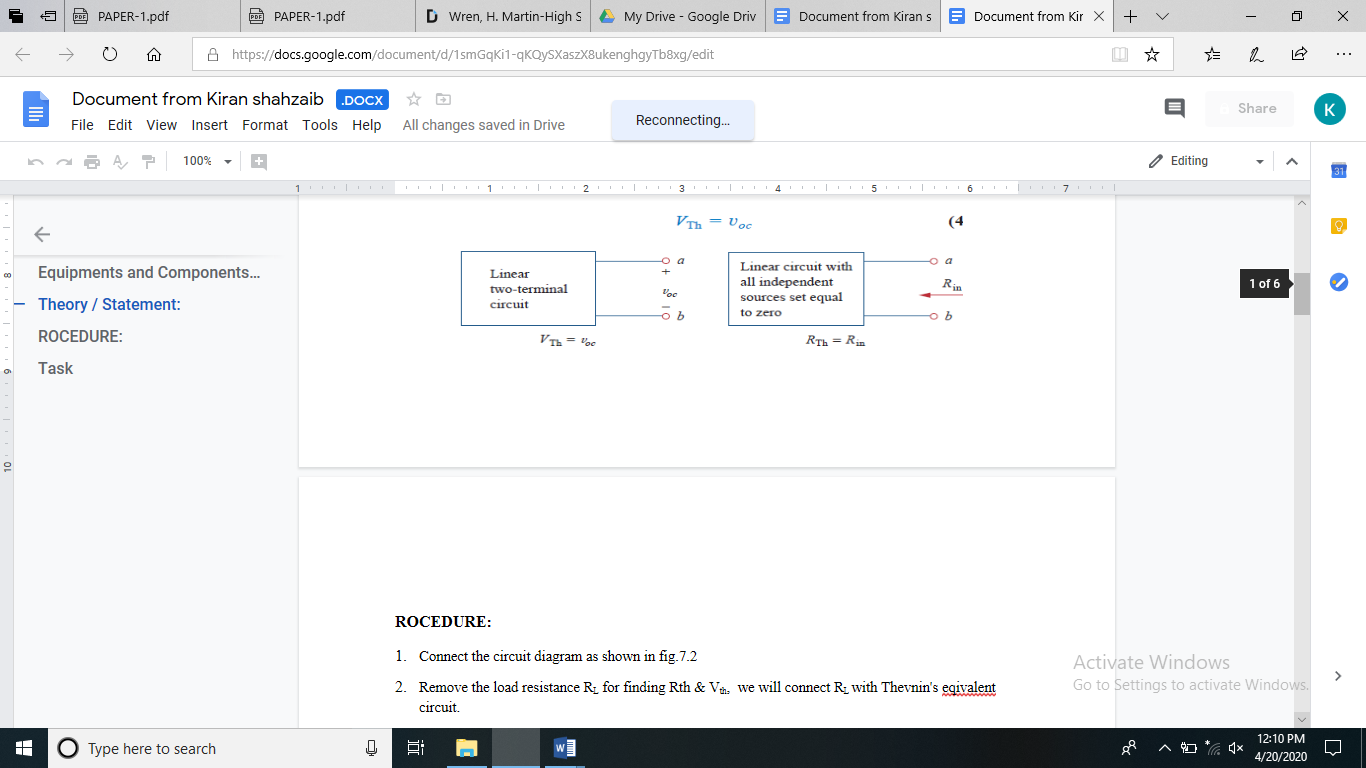


Fig. 5.1 a (Linear two terminal circuit) Fig 5.1 b (Thevenin Equivalent circuit)

According to Thevenin’s theorem, the linear circuit in Fig. 5.1(a) can be replaced by that in Fig. 5.1(b). (The load  may be a single resistor or another circuit.) The circuit to the left of the terminals in Fig. 5.1(b) is known as the Thevenin equivalent circuit;

***" Thevenin’s theorem states that a linear two-terminal circuit can be replaced by an equivalent circuit consisting of a voltage source VTh in series with a resistor RTh, where VTh is the open-circuit voltage at the terminals and RTh is the input or equivalent resistance at the terminals when the independent sources are turned off.***



**ROCEDURE:**

1. Connect the circuit diagram as shown in fig.5.2
2. Remove the load resistance Rl for finding Rth & VTH  we will connect RL with Thevenin's equivalent circuit.
3. Find Rthby turned off all independent sources  ( Voltage source Short Circuit & Current Source open Circuit)
4. Measure open circuit voltage Voc  by open circuiting terminals.
5. Draw the Thevenin’s equivalent circuit as shown in fig 5.5
6. Measurement current in RL.

* Find the Thevenin equivalent circuit of the circuit shown in Fig. 5.2  to the left of the terminals a-b, Then find the current through RL = 6 Ω,

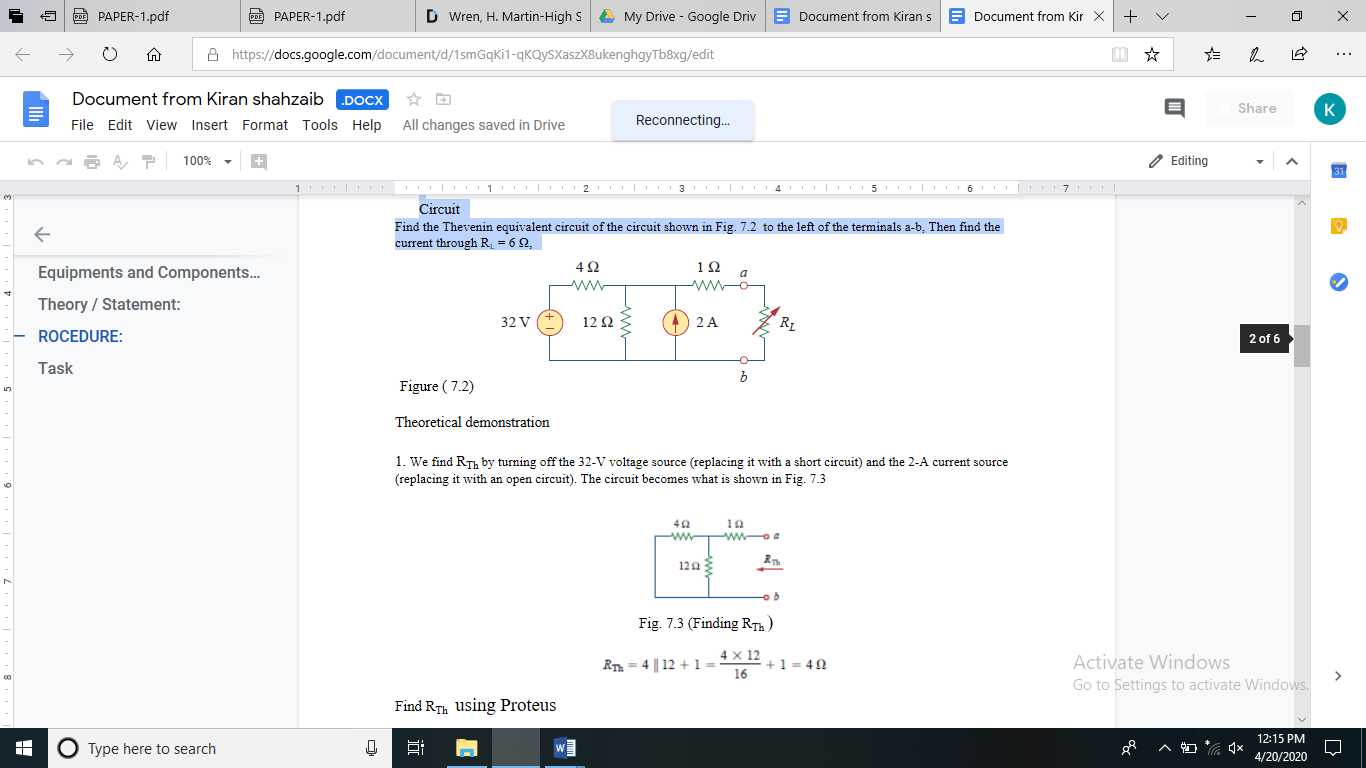


Fig 5.2 Circuit Diagram

**Theoretical demonstration**

1. We find RTh by turning off the 32-V voltage source (replacing it with a short circuit) and the 2-A current source (replacing it with an open circuit). The circuit becomes what is shown in Fig. 5.3.

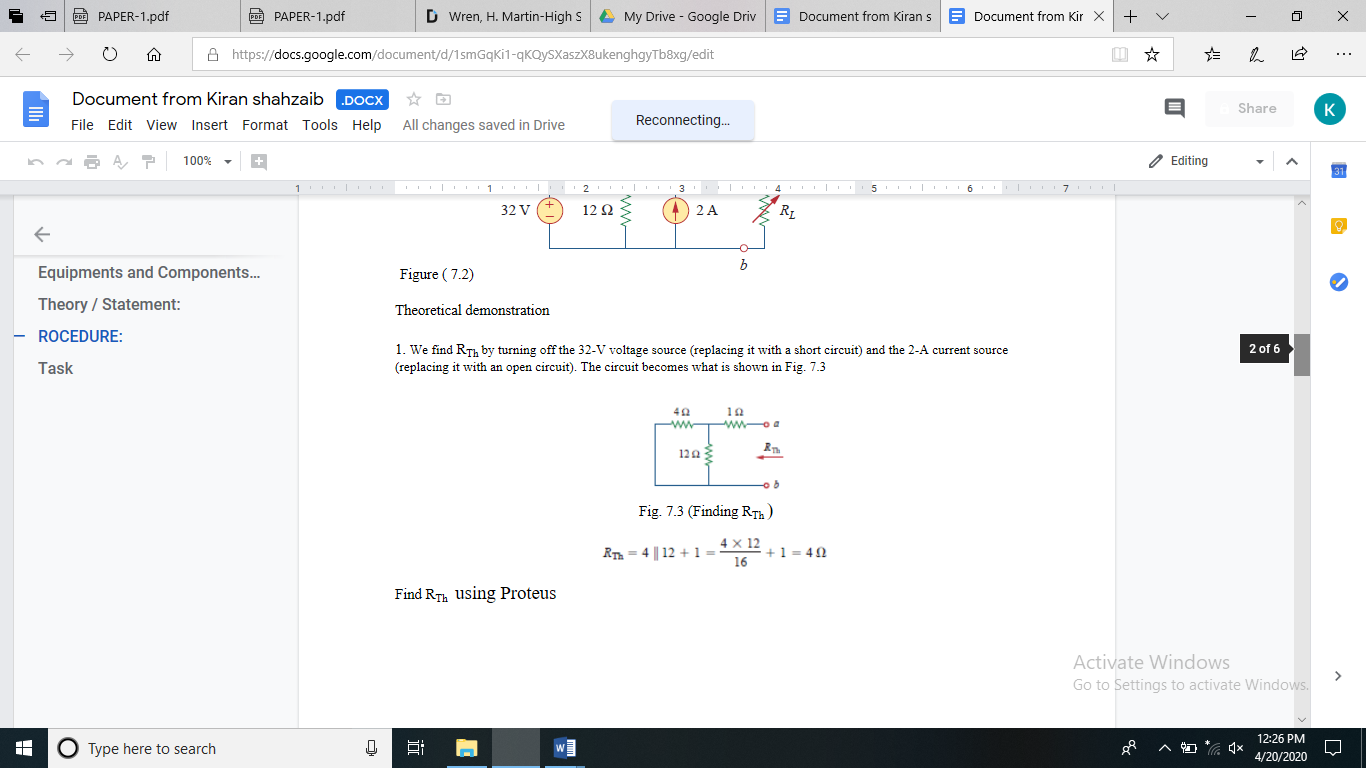
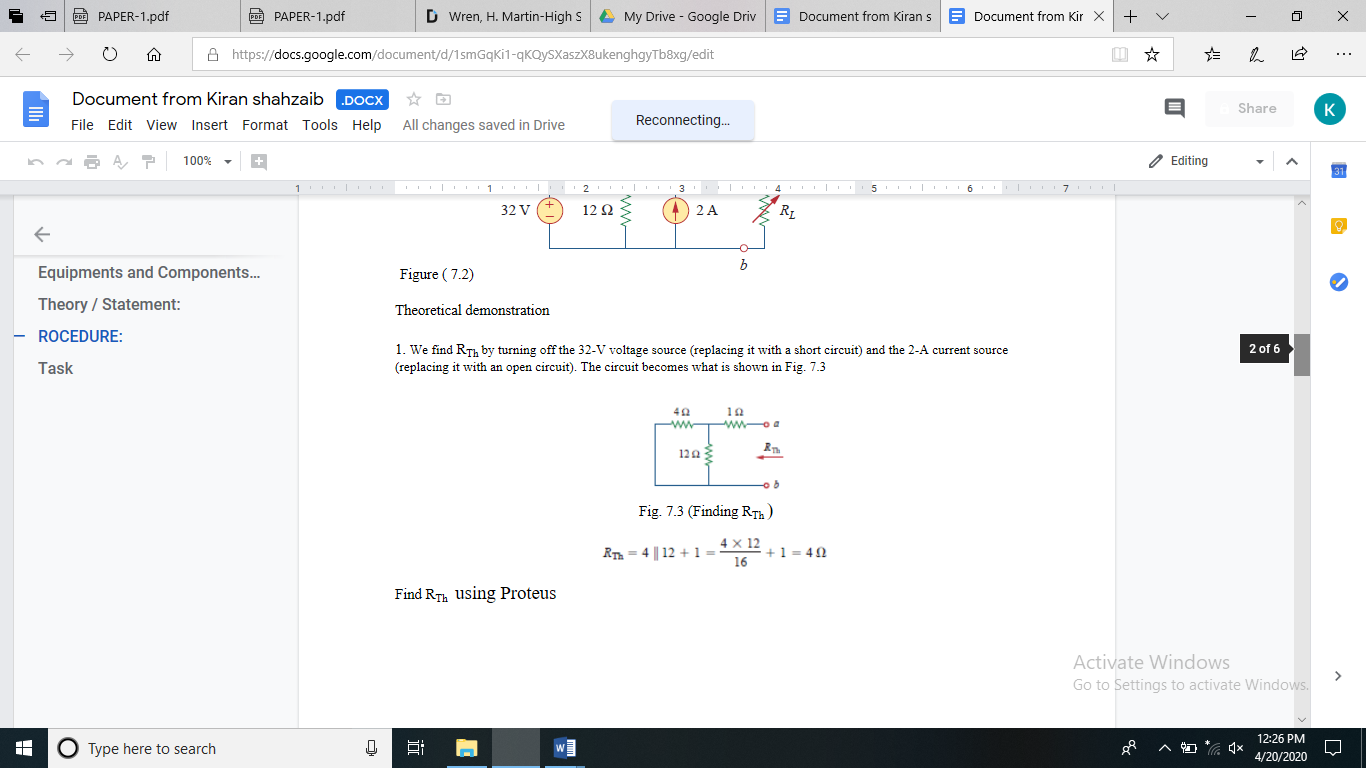


Fig 5.3 Finding Rth



2. To find consider the circuit in Fig. 5.4 a. use nodal analysis or mesh, we are using nodal analysis.

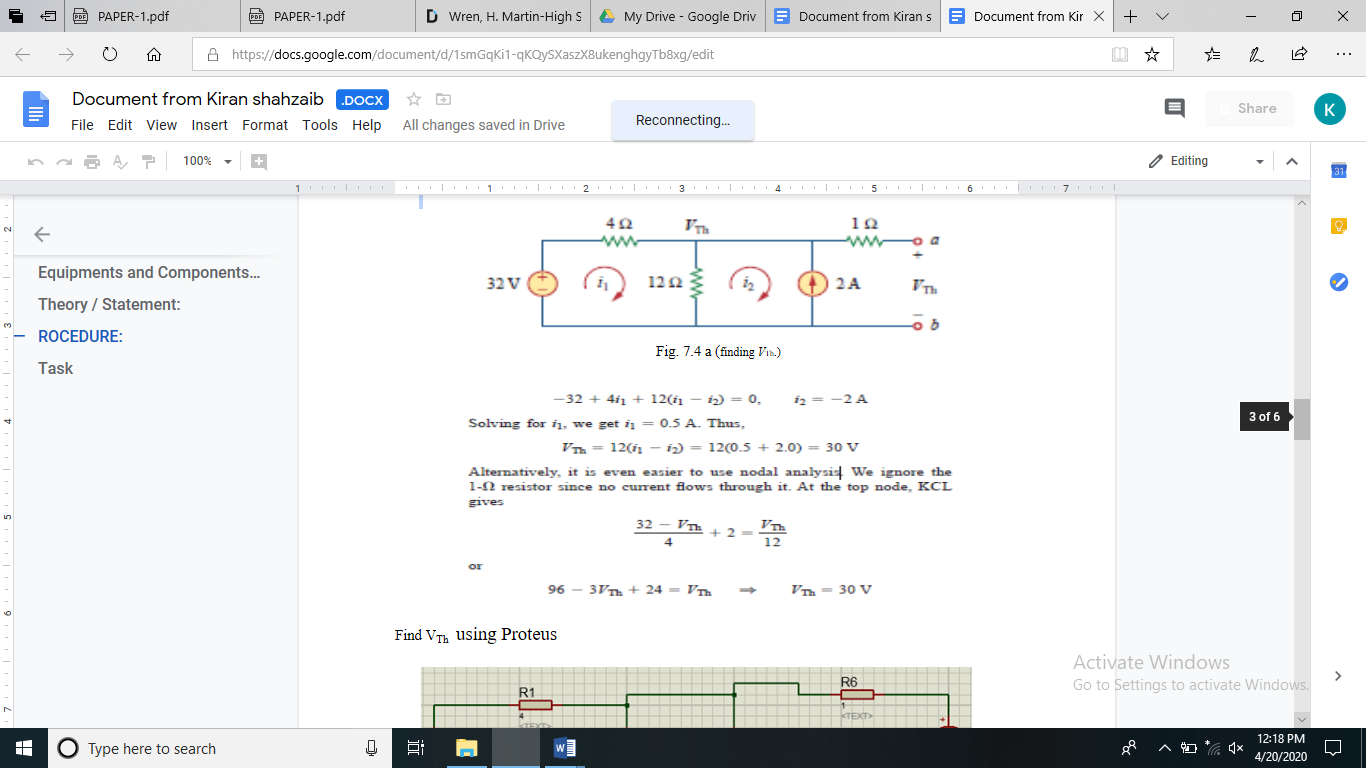
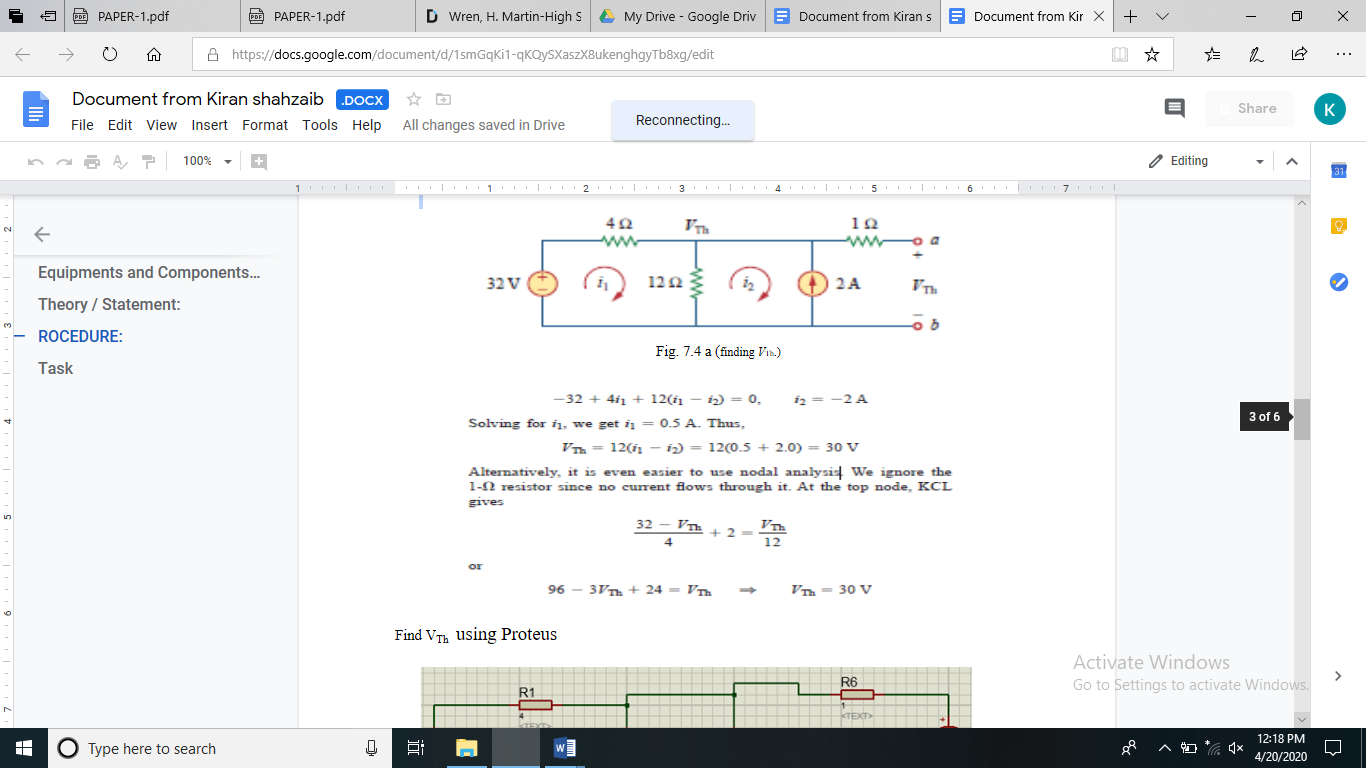


Fig 5.4



1. The Thevenin equivalent circuit is shown in Fig. 5.5.

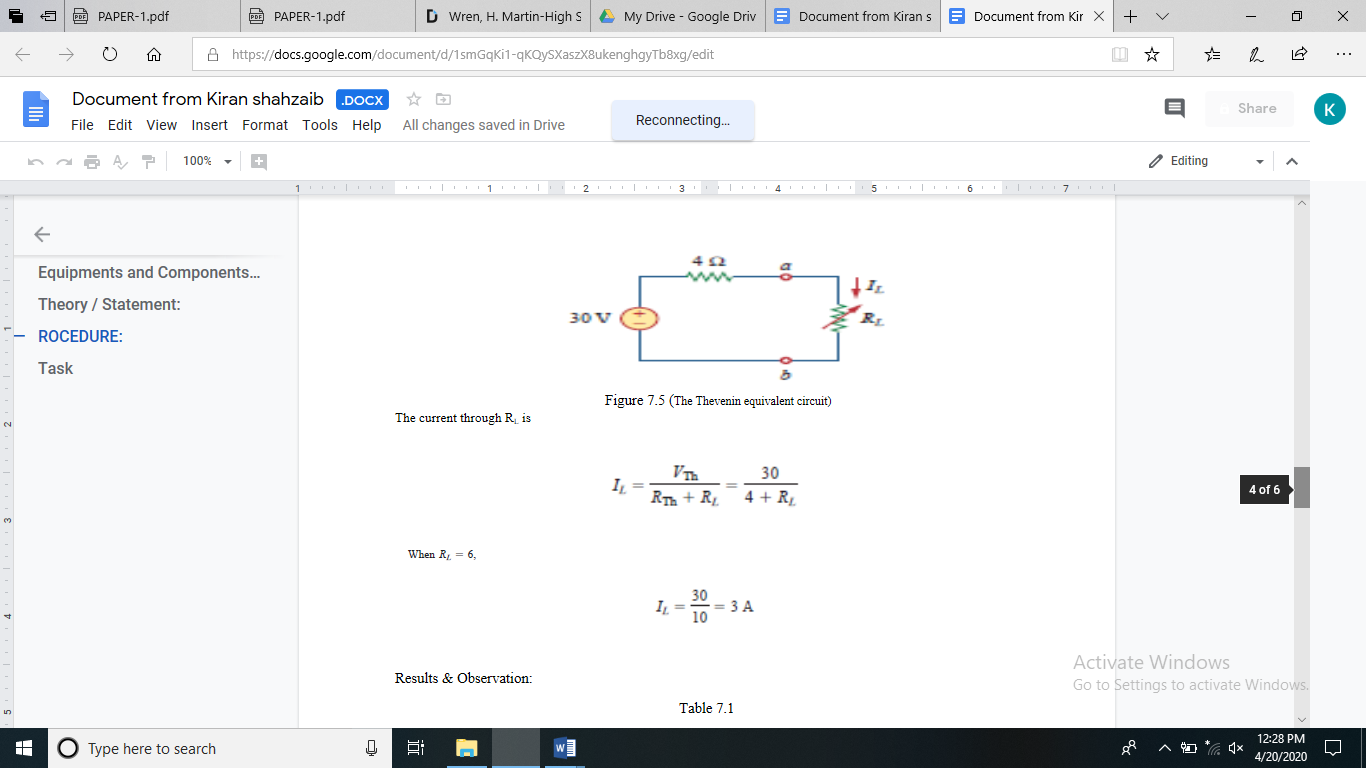
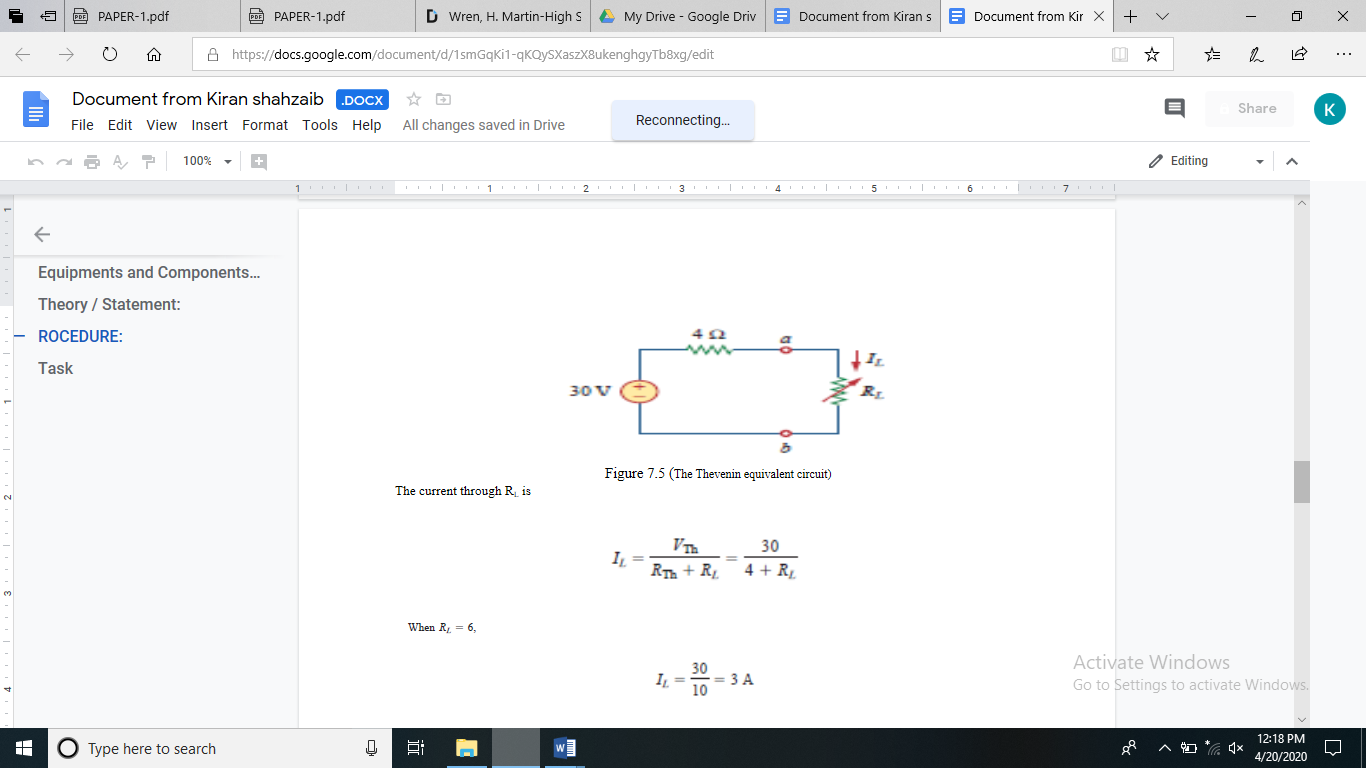


Fig 5.5 Thevenin Equivalent Circuit

Finding Current through load resistance is.

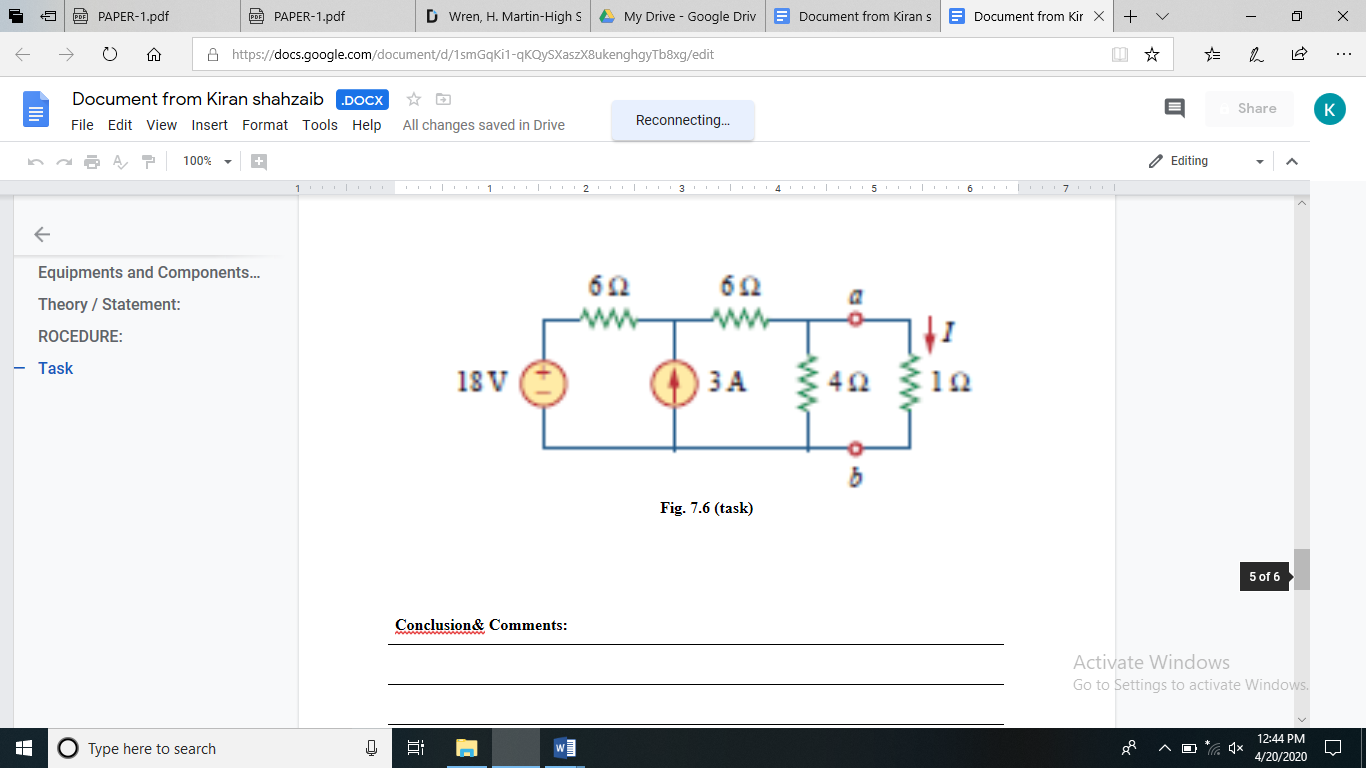


**Observation Table:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameters** | **Voc** | **RTH** | **IL** |
| **Theortical Values** |  |  |  |
| **Practical Values** |  |  |  |

**Task:**

Find the Thevenin equivalent circuit and find current as well.



Conclusion:

Comments: