Electrical Engineering Department

Prelab2

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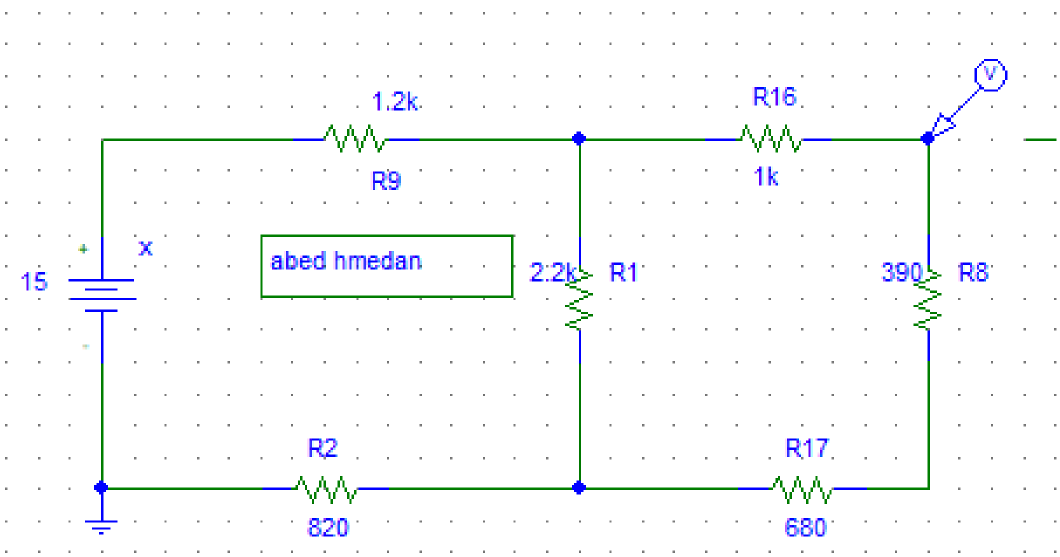
Date:22/9/2018

Part A: Proportionality

1 For the circuit of Figure 4.1, use PSPICE to generate a plot of (VO) (use differential voltage marker), for a Vin sweep from 0 to 15 V in a 1.5V step, use cursors to mark data point at Vin = 5 and 10 V.



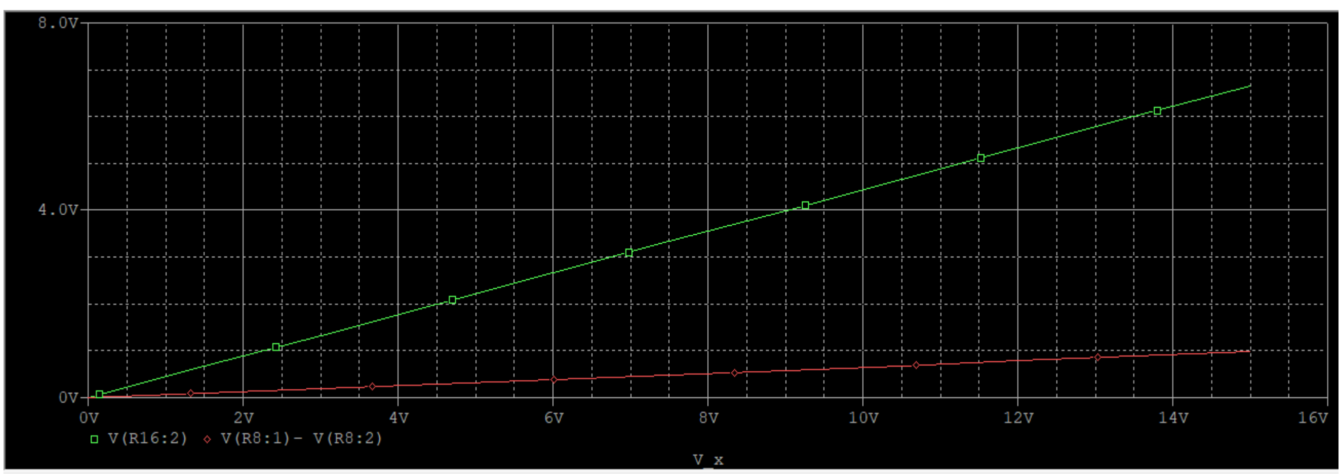


Fig 4.1

Part B: Superposition 1. Use PSPICE to determine the voltages at all nodes and the current in all the branches for the circuits in Figures 4.2 to 4.4.

Fig4.2

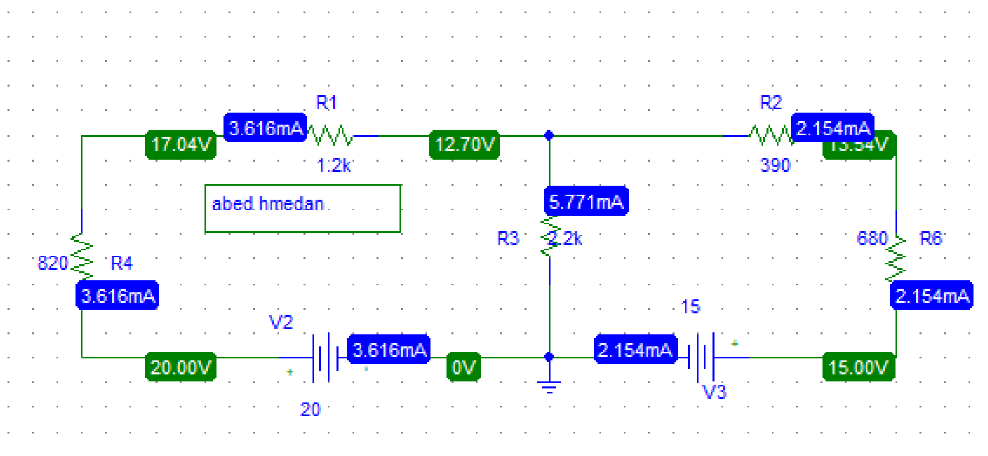
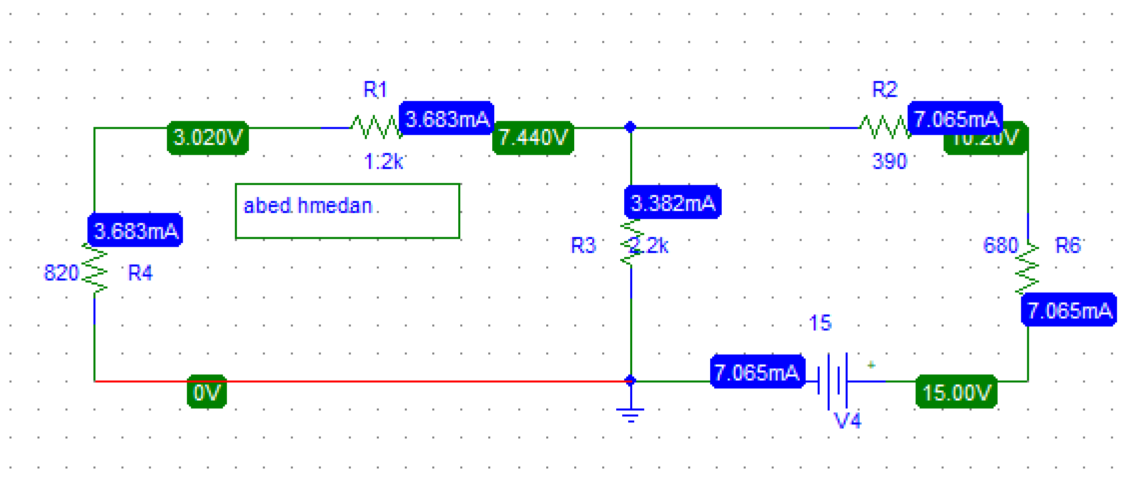
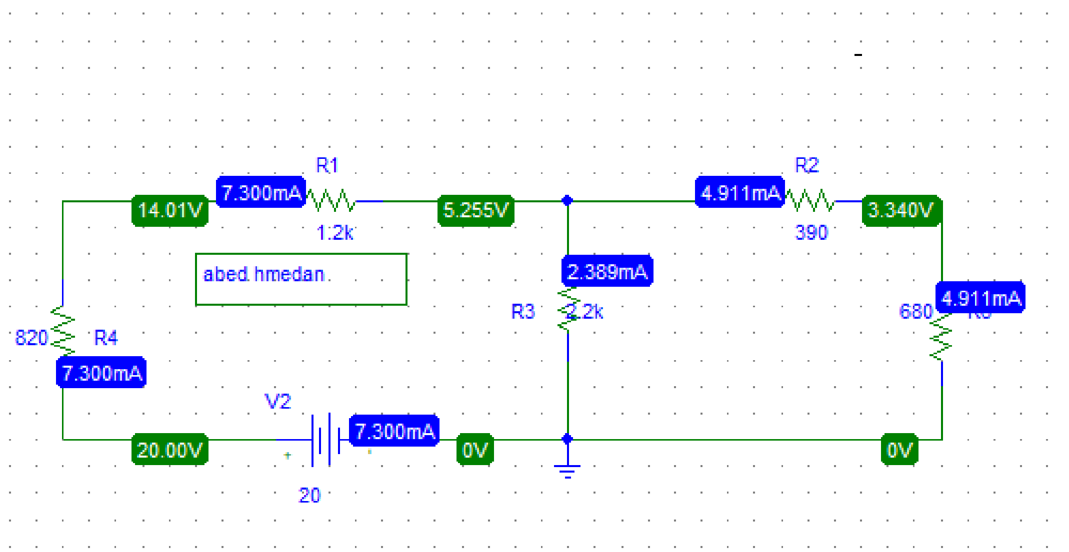

R1
3.616mA
17.04V
1.2k
12.70V
R2
2.154mA
13.54V
390
abed hmedan
5.771mA
R3
2.2k
680
R6
820
R4
3.616mA
2.154mA
V2
15
3.616mA
2.154mA
20.00V
0V
15.00V
V3
20

Fig 4.3


R1
3.683mA
3.020V
7.440V
1.2k
R2
7.065mA
10.20V
390
abed hmedan
3.382mA
3.683mA
R3
2.2k
680
R6
820
R4
7.065mA
15
7.065mA
0V
15.00V
V4

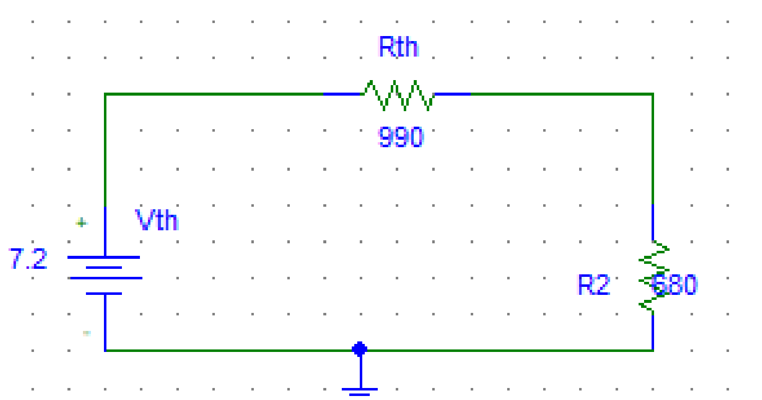


Part C: Thevenin's Theorem

1. Find and draw the Thevenin equivalent with respect to the terminals X, Y for the circuit in Figure 4.5 (Show calculation of VThevenin and RThevenin).

Vth = (2.2/(2.2+.82))*10 = 7.2 V

Rth = (820//2.2k)+390 = 990 ohm



2. Simulate the circuit of Figure 4.5 using PSPICE to determine the value of voltage around and current through the 680 Ω resistor

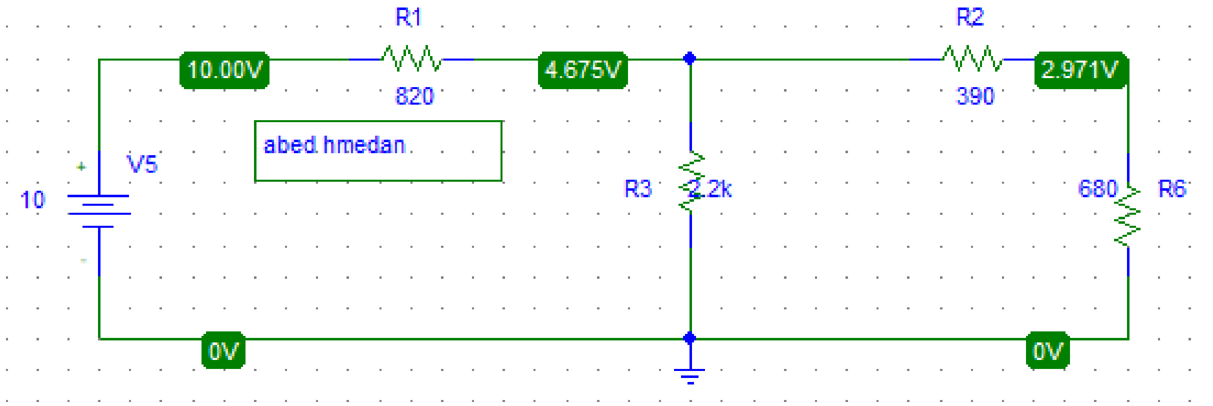
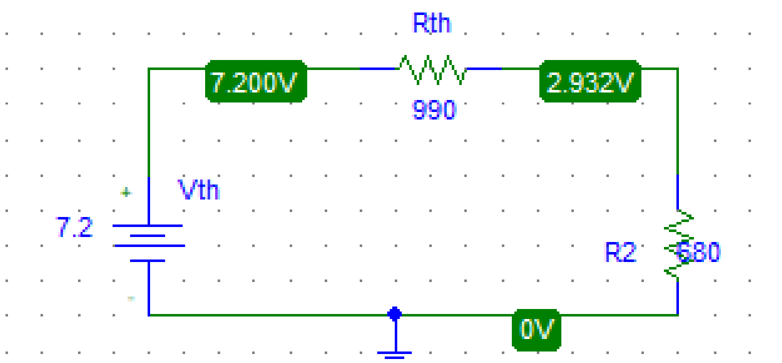


Fig 4.5

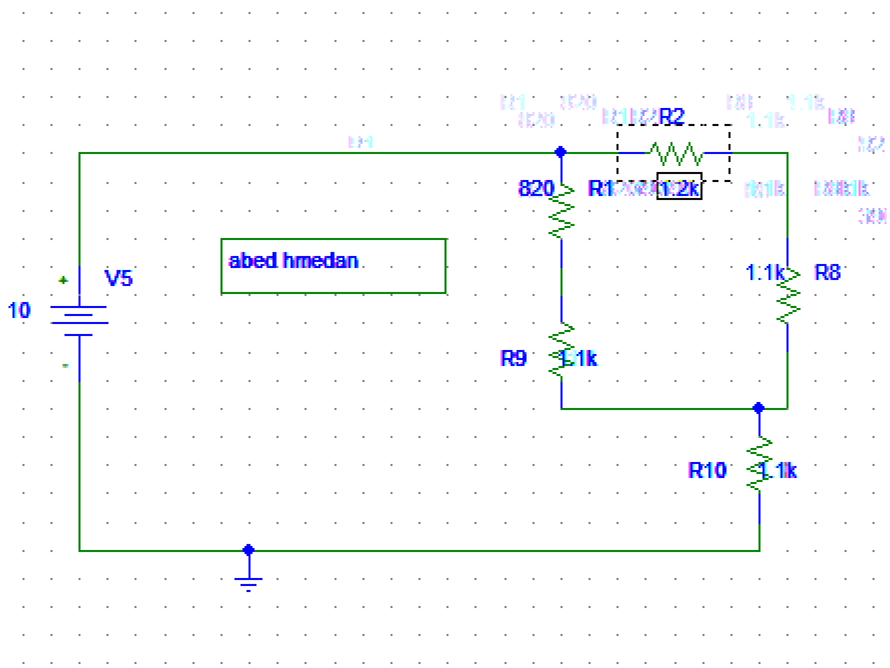
3. Simulate Thevenin equivalent circuit that you found in step 1 shown in Figure 4.7 using PSPICE to determine the value of voltage around and current through the 680 Ω resistor



Part D: Δ-Y Transformation

1. For the circuit of Figure 4.8 calculate the equivalent Y for the Δ formed by the three 3.3kΩ resistors, draw the resulting circuit.

Ry1 = 1/3 * R Δ = 1.1k



2. Simulate the circuit of Figure 4.8 using PSPICE, find the value of the current I, and calculate voltage Vab from simulation results.

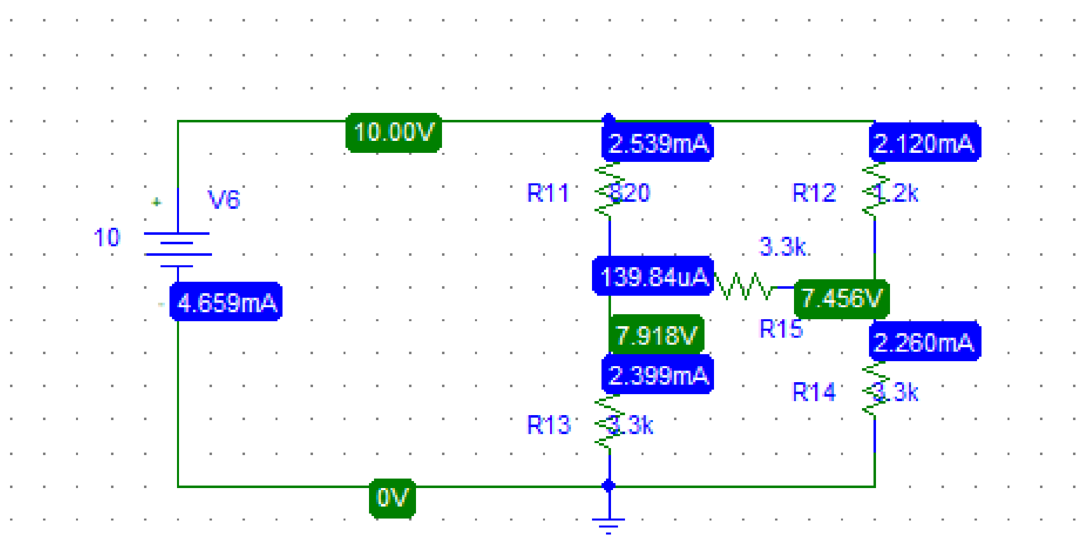
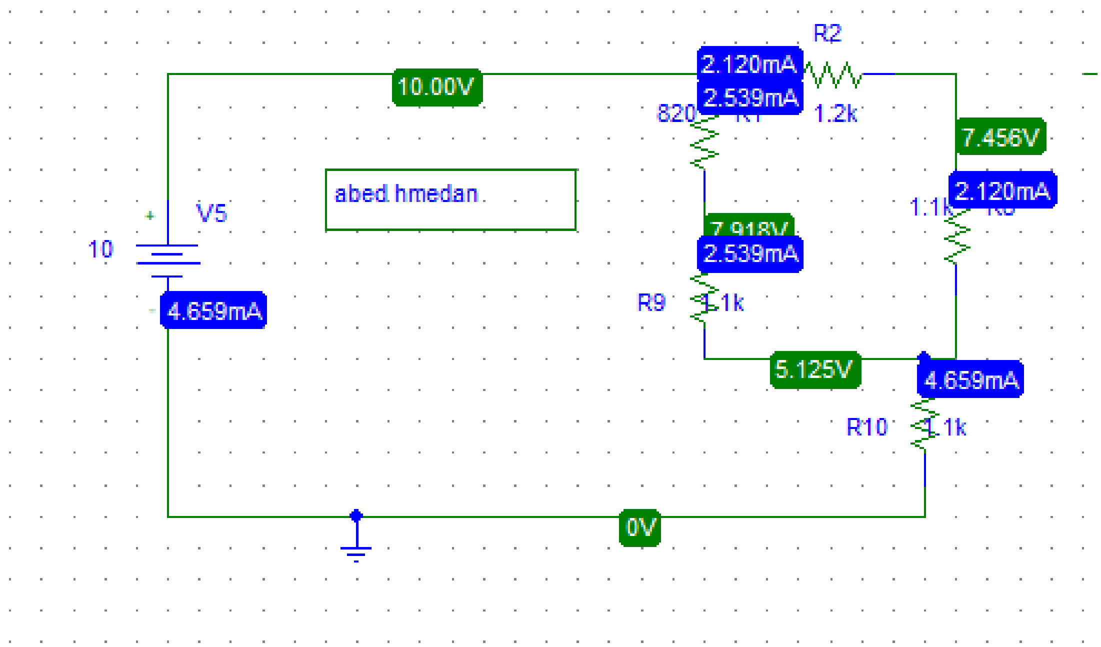


Fig 4.8

Vab = 7.918-7.456 = .462 V

I = 4.65 mA

3. Simulate the circuit resulting from replacing the Δ formed by 3.3 kΩ resistors with the equivalent Y found in step 1.



Part E: Reciprocity Theorem 1. Simulate the circuits of Figure 4.9 and Figure 4.10 using PSPICE to find the value of the current (I).

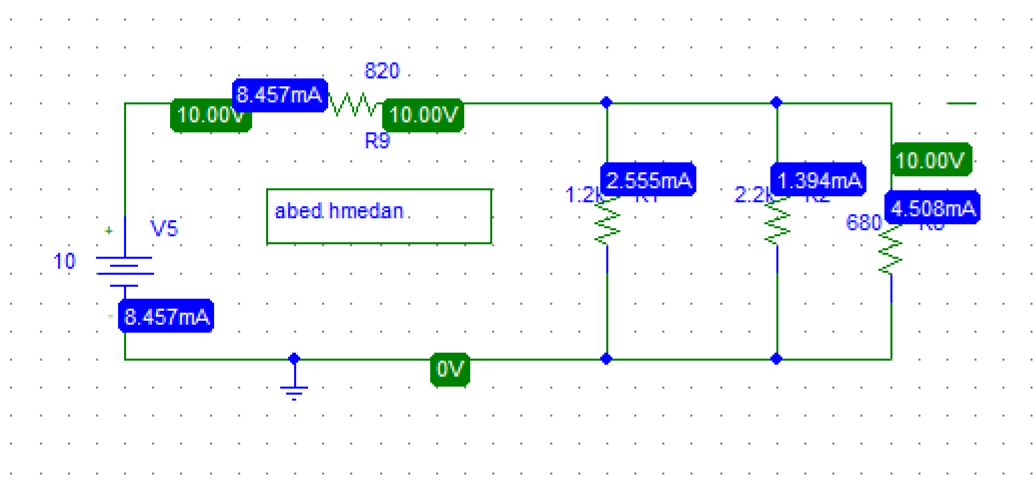
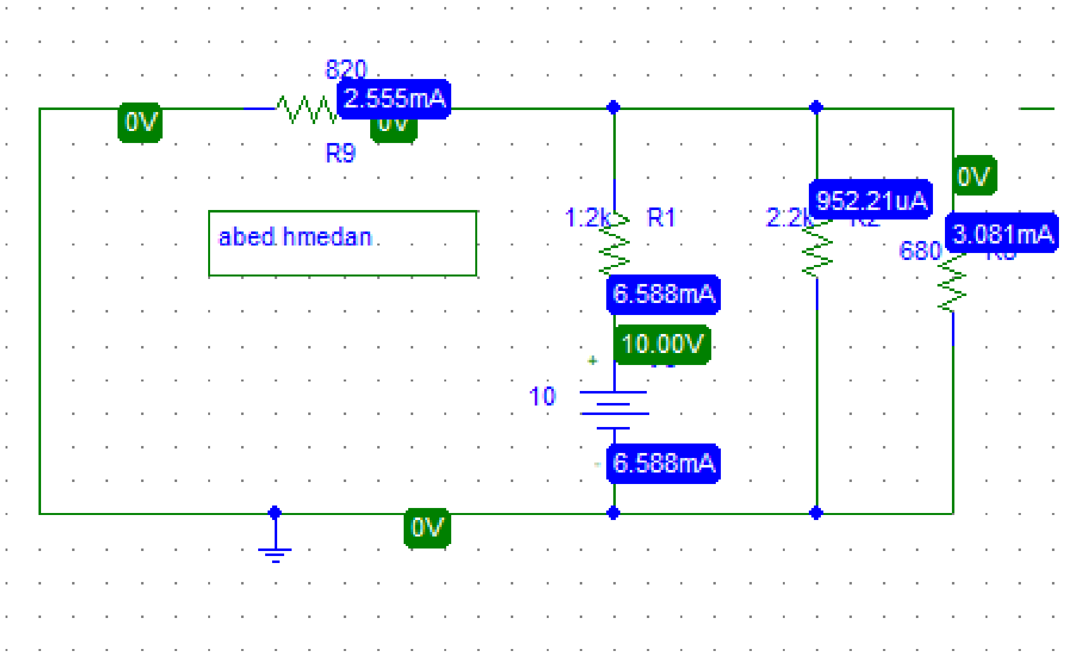


Fig 4.9



820
2.555mA
R9
0V
0V
abed hmedan
1.2k
R1
2.2k
952.21uA
0V
3.081mA
680
6.588mA
10.00V
10
6.588mA
0V

Fig 4.10