SREIES-PARALLEL NETWORK ANALYSIS, SIMULATION AND IMPLEMENATION

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This experiment is designed to assess your ability in analyzing, simulating and implementing a sereies-paprallel network. Please perform the following steps for the network below and record your results in the specified tables.

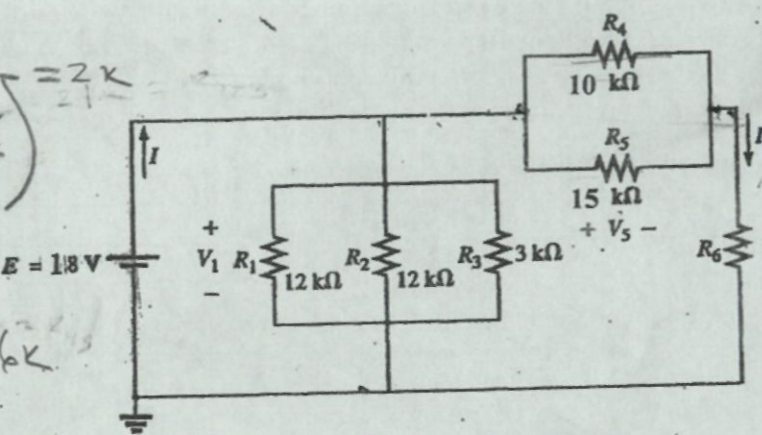

Figure 1.

1. **ANALYSIS** (Computations)

Perform the following computations and record your results in Table 1.

a) Label the current in each resistor with resistor number and assign a direction to each current.
b) Label the voltage and polarity of voltage drops across each resistors
c) Use series-parallel network theorems to calculate the total current supplied by the source and the currents in each resistors
d) Use Ohm's law to calculate the voltage across each resistors
e) Can we obtain similar results using any other method? If yes, outline the procedures for computing all currents and voltages using that method.

TABLE 1											
ANALYTICAL RESULTS											
I_1 (mA)	I_2 (mA)	I_3 (mA)	I_4 (mA)	I_5 (mA)	I_6 (mA)	V_1 (V)	V_2 (V)	V_3 (V)	V_4 (V)	V_5 (V)	V_6 (V)
1.5mA	1.5mA	6mA	0.6mA	0.4mA	1mA	18V	18V	18V	18V	18V	12V

2. SIMULATIONS

Use Pspice software to simulate the circuit of Figure 1. Then identify the current through and voltage across each resistor using the simulation results. Record these values in Table 2. Attach a copy of the simulation results to this assignment.
Compare the simulation results with your computational results. Are they close?

TABLE 2											
SIMULATION RESULTS											
I_1 (mA)	I_2 (mA)	I_3 (mA)	I_4 (mA)	I_5 (mA)	I_6 (mA)	V_1 (V)	V_2 (V)	V_3 (V)	V_4 (V)	V_5 (V)	V_6 (V)
1.5mA	1.5mA	6mA	0.6mA	0.4mA	1mA	18V	18V	18V	18V	18V	12V

3. LABORATORY IMPLEMENTATION

Assemble the circuit of Figure 1 in the laboratory using resistors, power supply, and breadboard. First measure each resistor carefully and record its measured value in Table 3. Then assemble the circuit and use Digital Multimeter to measure the voltages across each resistor and record them in Table 1. Use Ohm's law to compute the current in each resistor and specify its direction. Compare your results with the analytical results and simulation results. Are they close?

$\frac{18.12}{11.9K} = 1.52mA$

$\frac{18.12}{11.97K} = 1.51mA$

$\frac{18.12}{2.97K} = 6.1mA$

$\frac{5.85}{10.08K} = 580\mu A$

$\frac{5.85}{14.8K} = 395\mu A$

$\frac{12.26}{12.55K} = 976\mu A$

TABLE 3												
LABORATORY RESULTS												
Measured Values												
R_1 (KΩ)	R_2 (KΩ)	R_3 (KΩ)	R_4 (KΩ)	R_5 (KΩ)	R_6 (KΩ)							
11.9K	11.97K	2.97K	10.08K	14.8K	12.55K							
Computed Values						Measured Values						
I_1 (mA)	I_2 (mA)	I_3 (mA)	I_4 (mA)	I_5 (mA)	I_6 (mA)	V_1 (V)	V_2 (V)	V_3 (V)	V_4 (V)	V_5 (V)	V_6 (V)	
1.52mA	1.51mA	6.1mA	580μA	395μA	976μA	18.12V	18.12V	18.12V	5.85V	5.85V	12.26V	