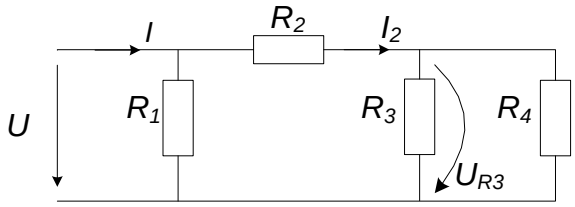
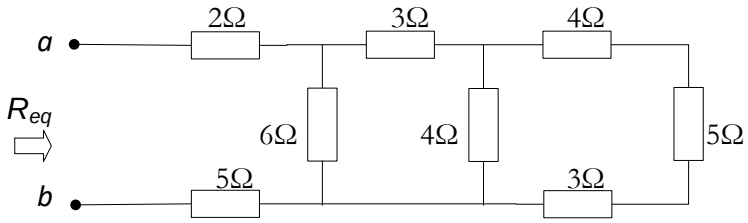
Resistors. Ohm's Law

1-1 *For the circuit below we know: R_1=10Ω, R_2=9Ω, R_3=15Ω, R_4=10Ω and supplying voltage U=60V. Calculate: a) the equivalent resistance regarding the supplying terminals, R_e; b) the total current absorbed by the resistances, I; c) the current through the resistance R_2, I_2; d) the voltage on the resistance R_3, U_{R3}; the power dissipated in the resistance R_4, P_{R4}.*



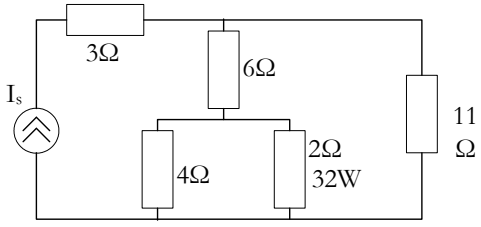
Problem 1-8

1-2 *Find the value of the equivalent resistance, R_{eq}, between terminals a and b, for the sub-circuit shown below.*



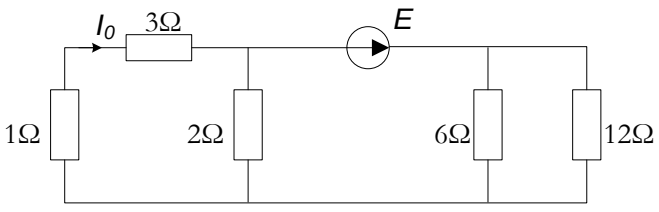
Problem 1-13

1-3 *Determine the current I_s generated by the current source in the circuit below if the power dissipated in the 2Ωs resistance is 32W.*



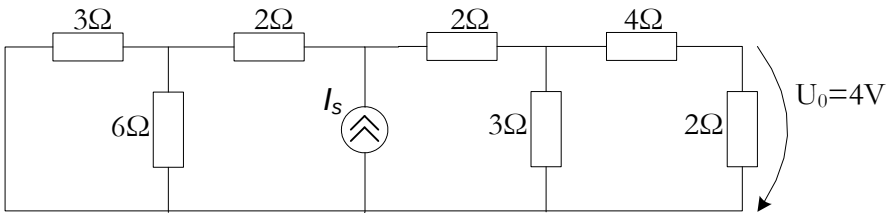
Problem 1-17

1-4 *Determine the voltage E generated by the voltage source in the circuit below if the current flow to the 3Ωs resistance is I_0=4A.*



Problem 1-18

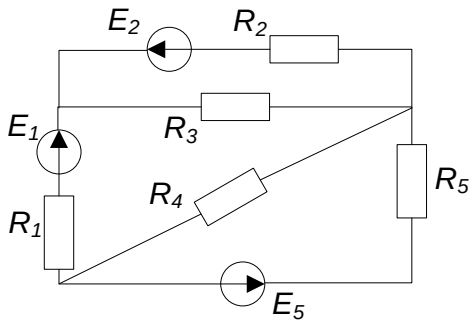
1-5 *Determine the current I_s generated by the current source in the circuit below if the voltage drop on the 2Ωs resistance is 4V.*



Problem 1-21

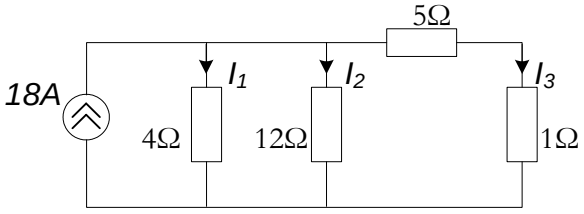
Kirchhoff's Laws

2-1 *For the circuit below we know: R_1=5Ω, R_2=10Ω, R_3=6Ω, R_4=3Ω, R_5=2Ω, E_1=10V, E_2=5V, E_5=5V. Identify the number of nodes and circuit branches and calculate the branch currents using: a) the Kirchhoff Laws; b) the nodal analysis; c) the mesh analysis. Calculate the generated and removed power in the circuit and verify the power conservation theorem.*



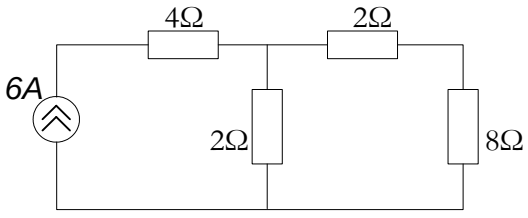
Problem 2-1

2-2 *Find the currents I_1, I_2, I_3 for the circuit below and verify the power conservation theorem.*



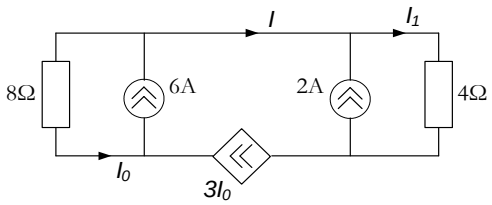
Problem 2-4

2-3 *For the circuit below calculate the dissipated power in the 8Ω's resistance.*



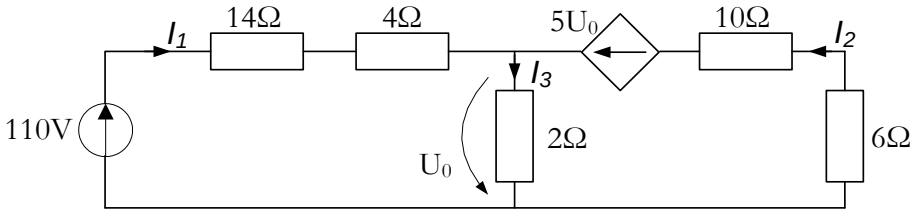
Problem 2-5

2-4 *Find the currents I, I_0, I_1 for the circuit below and verify the power conservation theorem.*



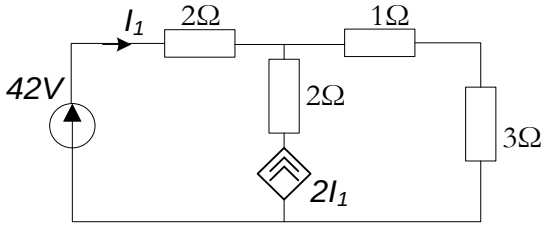
Problem 2-6

2-5 *Find the currents I_1, I_2, I_3 for the circuit below and verify the power conservation theorem.*



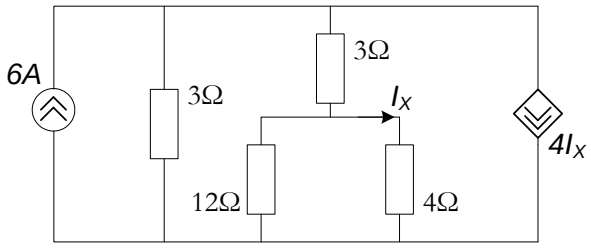
Problem 2-7

2-6 *Find the currents I_1 for the circuit below and verify the power conservation theorem.*



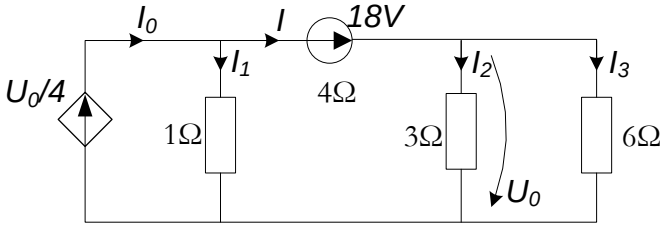
Problem 2-9

2-7 *Find the currents I_X for the circuit below and verify the power conservation theorem.*



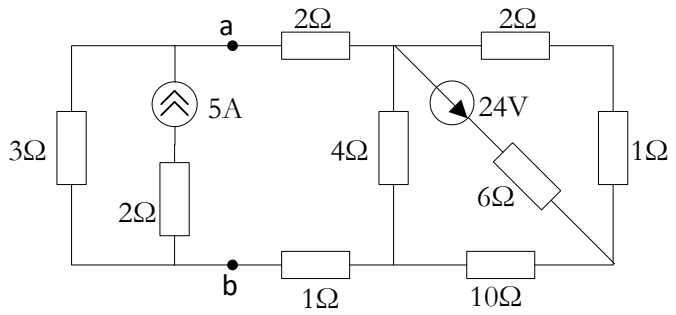
Problem 2-10

2-8 *Find the currents I_0, I_1, I_2, I_3, I for the circuit below and verify the power conservation theorem.*



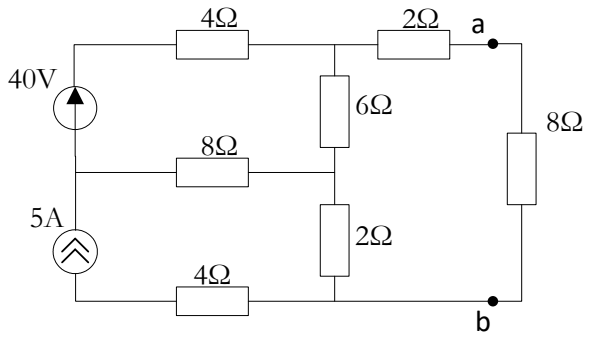
Problem 2-14

2-9 *Suppress all the sources in the circuit below and calculate the equivalent resistance, R_{eq}, regarding to the terminals a and b.*



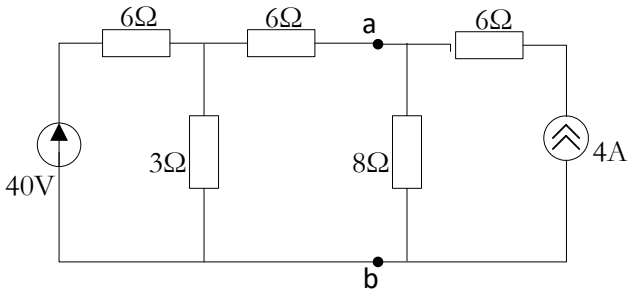
Problem 2-16

2-10 *Suppress all the sources in the circuit below and calculate the equivalent resistance, R_{eq}, regarding to the terminals a and b.*



Problem 2-17

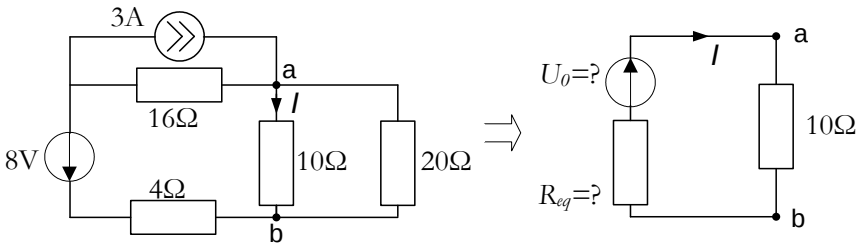
2-11 *Suppress all the sources in the circuit below and calculate the equivalent resistance, R_{eq}, regarding to the terminals a and b.*



Problem 2-19

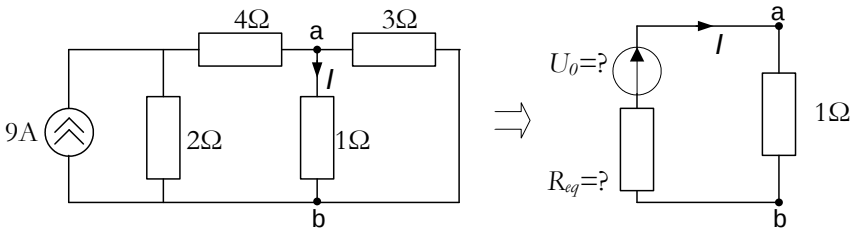
Thevenin's and Norton's Theorem

2-12 *Determine the Thevenin equivalent circuit (R_{eq}, U_0), viewed by the 10Ωs resistance (terminals a and b) for the circuit below. Find the current I through the 10Ωs resistance.*



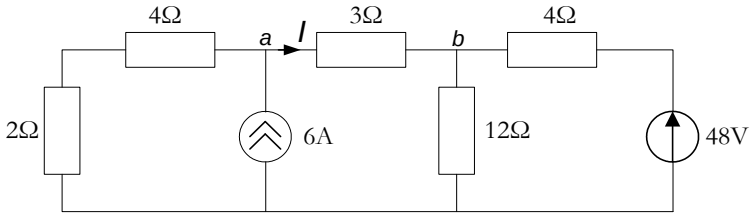
Problem 2-23

2-13 *Determine the Thevenin equivalent circuit (R_{eq}, U_0), viewed by the 1Ωs resistance (terminals a and b) for the circuit below. Find the current I through the 1Ωs resistance.*



Problem 2-24

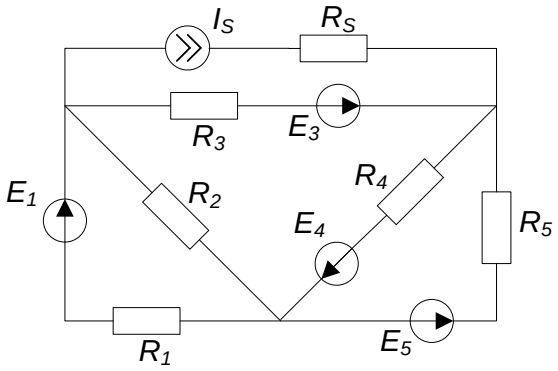
2-14 *Determine the Thevenin equivalent circuit (R_{eq}, U_0), viewed by the 3Ωs resistance (terminals a and b) for the circuit below. Find the current I through the 3Ωs resistance.*



Problem 2-25

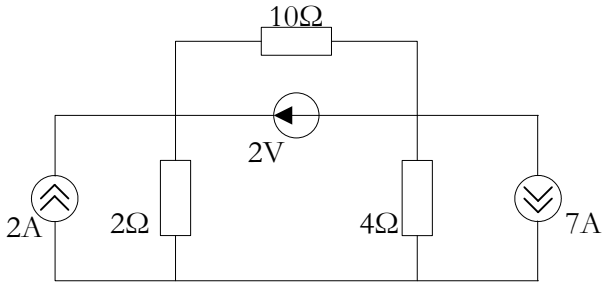
Nodal and Mesh Analysis

2-15 *For the circuit below, use the nodal analysis to calculate the potential of the nodes. Find the currents in the circuit. The circuit parameters are:* $R_1 = R_4 = 4\Omega$, $R_2 = 2\Omega$, $R_3 = 6\Omega$, $R_5 = 3\Omega$, $R_s = 10\Omega$, $E_1 = E_3 = 6V$, $E_4 = 3V$, $E_5 = 4V$, $I_s = 2A$.



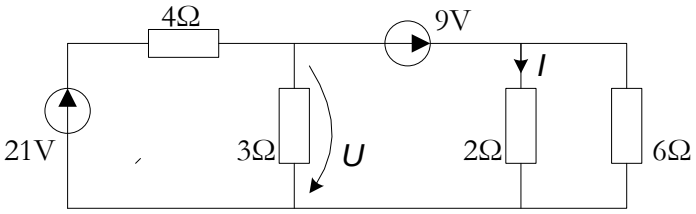
Problem 2-31

2-16 *For the circuit below, use the nodal analysis to calculate the potential of the nodes. Find the currents in the circuit.*



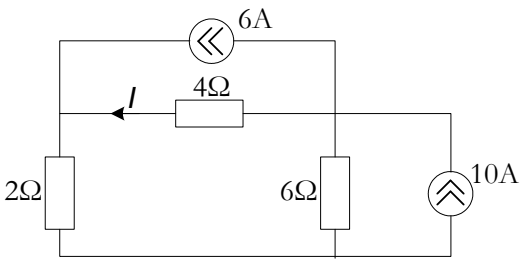
Problem 2-32

2-17 *For the circuit below, calculate the voltage U using: a) Norton's theorem; b) the nodal analysis. Calculate the current I using Thevenin's theorem.*



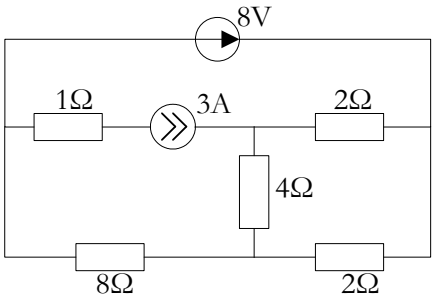
Problem 2-35

2-18 *For the circuit below, calculate the currents through the circuit using: a) the Kirchhoff laws; b) the nodal analysis; c) the mesh analysis. Verify the current I by using Thevenin's theorem. Verify the power conservation theorem.*



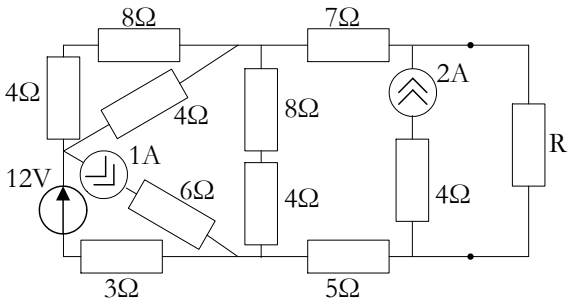
Problem 2-36

2-19 *For the circuit below, use the mesh analysis to find the currents in the circuit.*



Problem 2-39

2-20 *For the circuit below, determine the value of the resistance R which will absorb the greatest power from the circuit.*



Problem 2-41