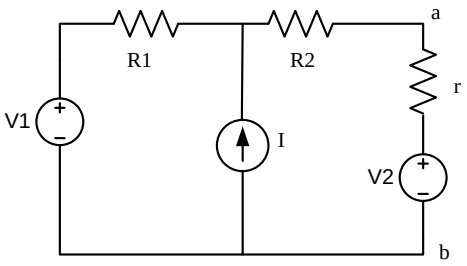
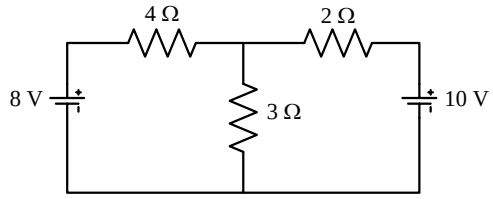
Numerical Problems on DC Networks

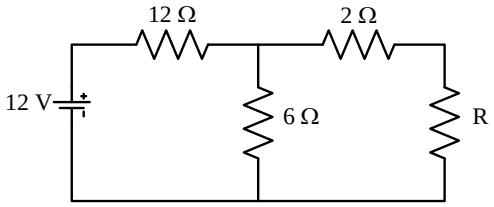
1. Find Thevenin's voltage across a-b terminal in the circuit given below. Also find the internal resistance across the open circuited a-b terminal, where R1 = 10ohm, R2 = 20ohm, V1 = 10volt, V2 = 20volt, I = 5A.



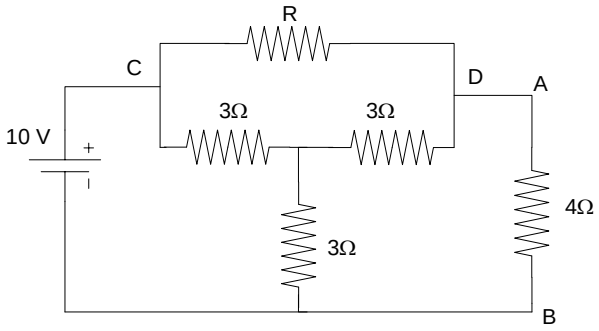
2. Determine the current through the 3 ohm resistance by Superposition Theorem & verify using nodal analysis.



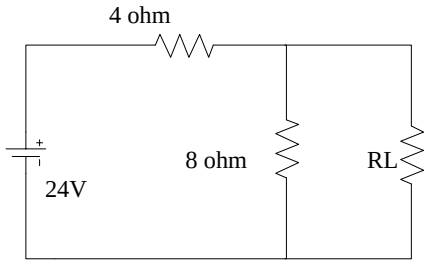
3. In the network, calculate the resistance R which will allow maximum power dissipated in it. Also calculate the maximum power.



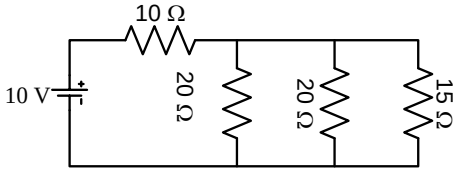
4. Determine the value of R in the following Figure such that the 4 Ω resistance consumes maximum power.



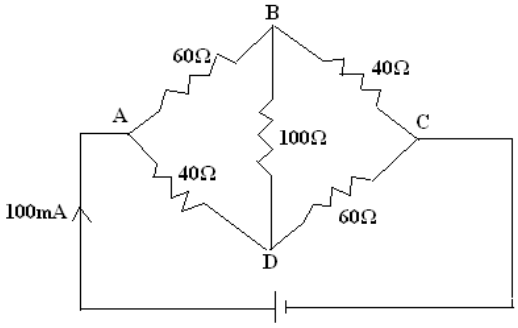
5. Find the value of load resistance (R_L) for which the power source will supply maximum power. Also find the value of maximum power for the network shown below:



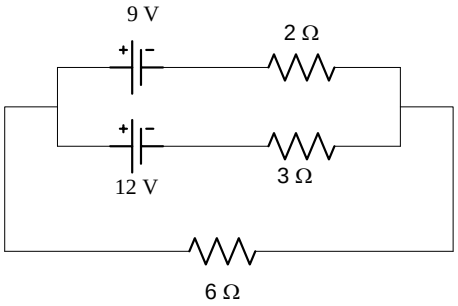
6. Determine the current I_l through the 15 ohm resistor in the network given by Norton's Theorem.



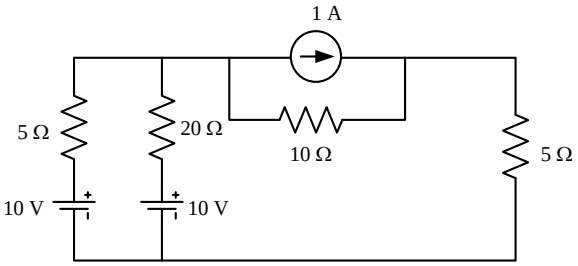
7. Find the currents through R_{BC}, R_{CD}, R_{BD} in the following circuit:



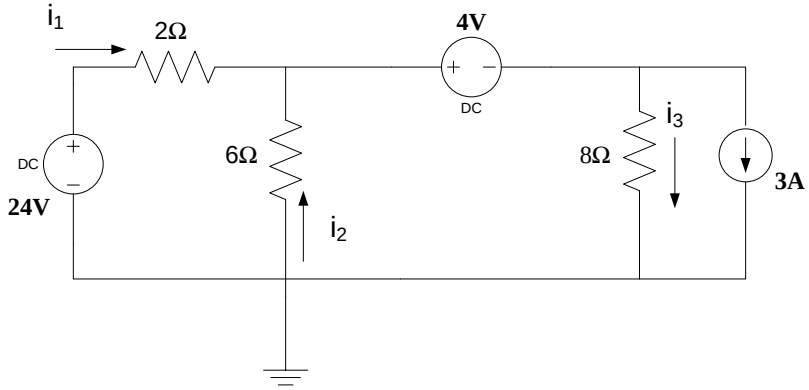
8. Calculate the current flowing through the 6Ω resistor with the help of superposition theorem.



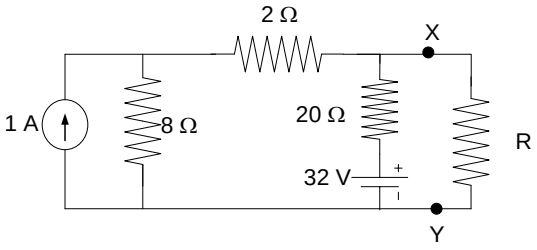
9. Find the current through 5 Ω Resistor using Thevenin's Theorem in the fig. Below



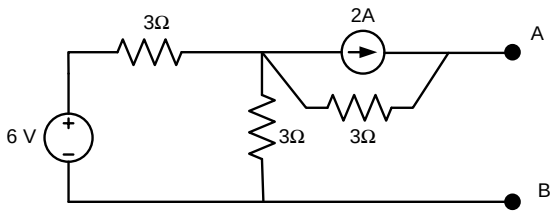
10. For the circuit shown below, determine the currents i_1, i_2, i_3 using nodal analysis:



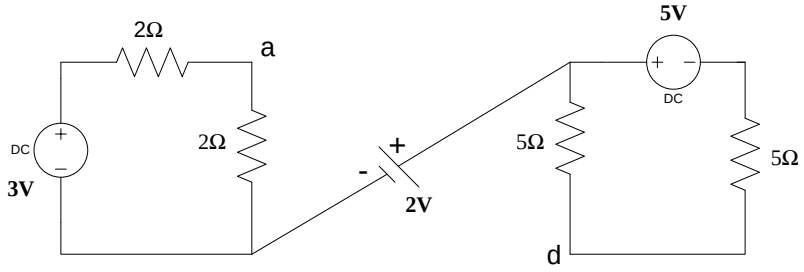
11. Find the Thevenin's equivalent circuit of the following figure between the terminals X-Y.



12. For the circuit shown in Figure determine equivalent source current and source resistance across A-B.



13. For the circuit shown below, find the potential difference between a and d:



Answers:

1. 60 V, 30 ohm
2. 2.153 A
3. 6 ohm, 0.667 W
4. 0 ohm
5. 2.67 ohm, 24 W
6. 0.25 A
7. I_{BC} = 160/3 mA, I_{DC} = 140/3 mA, I_{BD} = -20/3 mA
8. 1.42 A
9. 1.05 A
10. i1 = 6 A, i2 = - 2 A, i3 = 1 A
11. V_{th} = 16 V, R_{th} = 6.67 ohm
12. I_N = 2 A, R_N = 4.5 ohm
13. 2 V