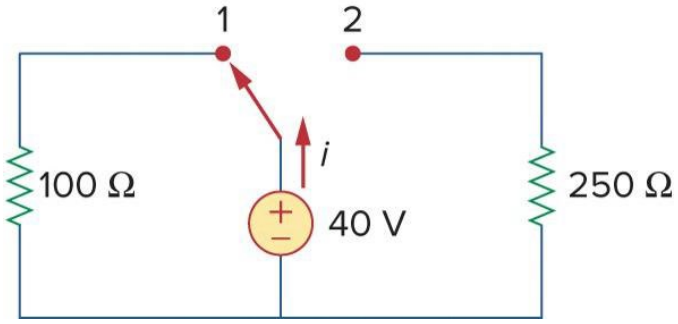
Electric Circuits

Homework Set 3

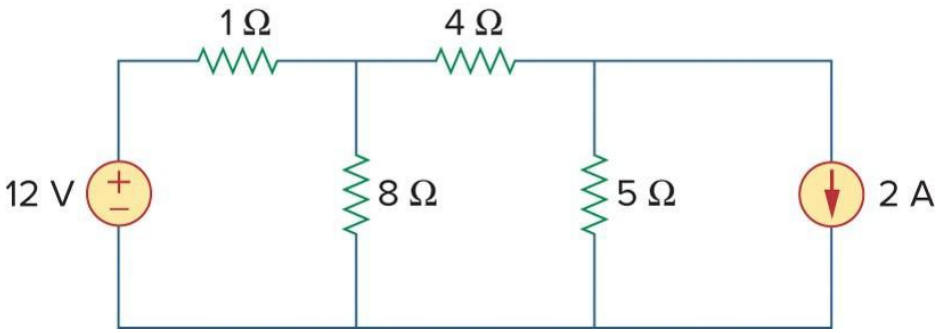
1. Find the hot resistance of a light bulb rated 60 W, 120 V.

2. A bar of silicon is 4 cm long with a circular cross section. If the resistance of the bar is 240 Ω at room temperature, what is the cross-sectional radius of the bar? (Note: $\rho_{silicon}$ = 640 Ω m)

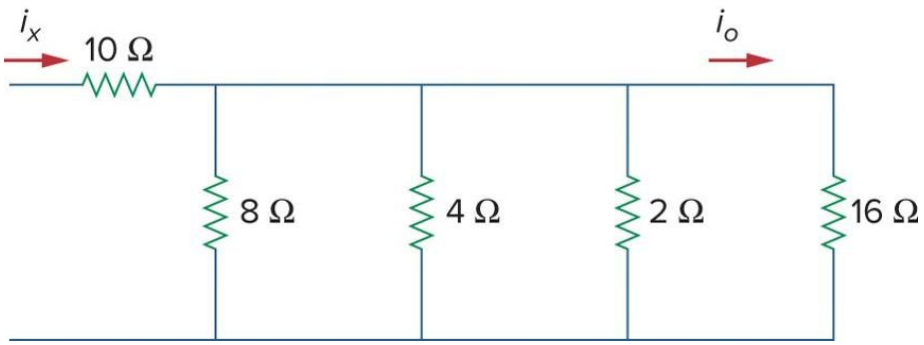
3. For the following circuit,
   a. Calculate the current when the switch is in position 1.
   b. Calculate the current when the switch is in position 2.



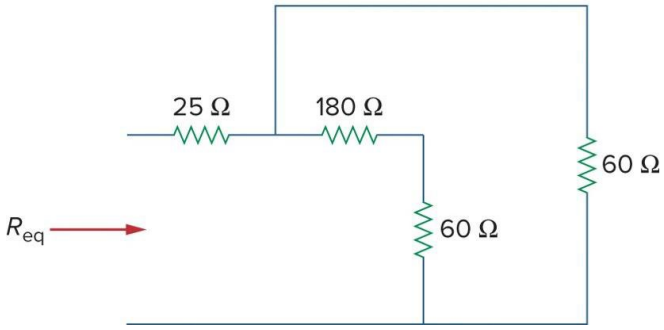
4. Determine the number of branches and nodes in the following circuit.



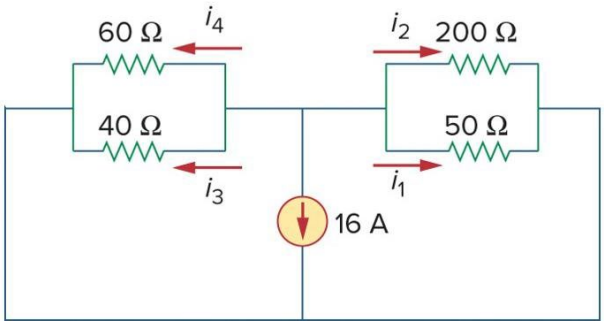
5. In the following circuit, i_o = 3 A. Calculate i_x and the total power absorbed by the entire circuit.



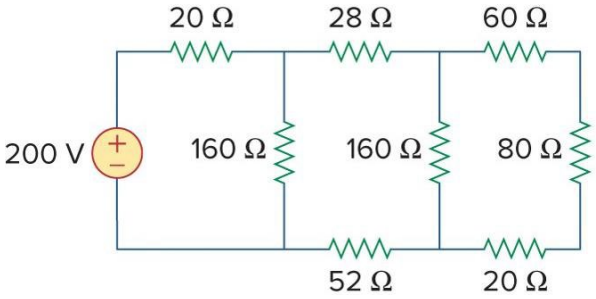
6. Find R_{eq} for the following Circuit.



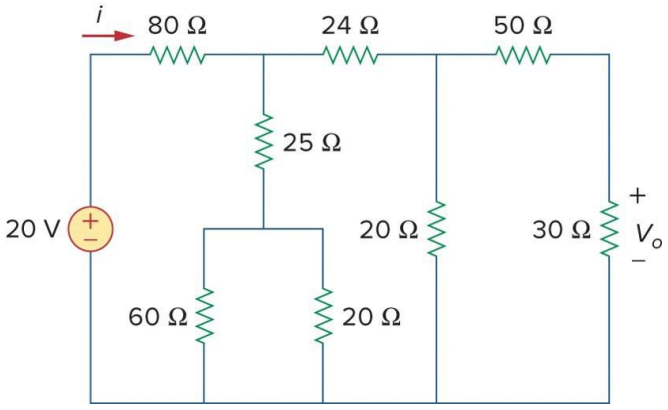
7. For the circuit below, find i_1 through i_4.



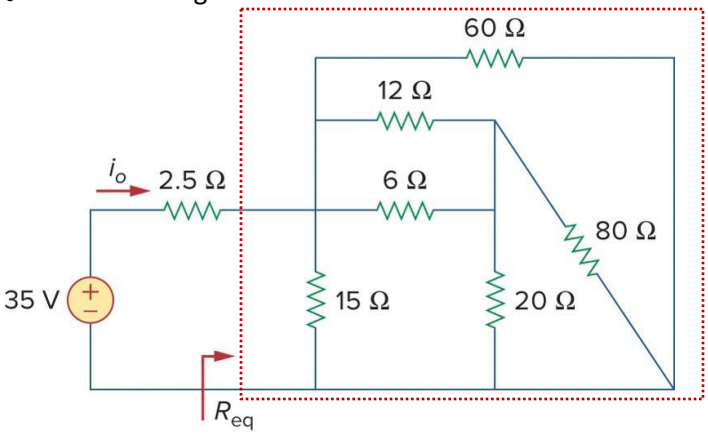
8. Using series/parallel resistance combination, find the equivalent resistance seen by the source in the following circuit. Use this value to determine the overall absorbed power by the resistor network.



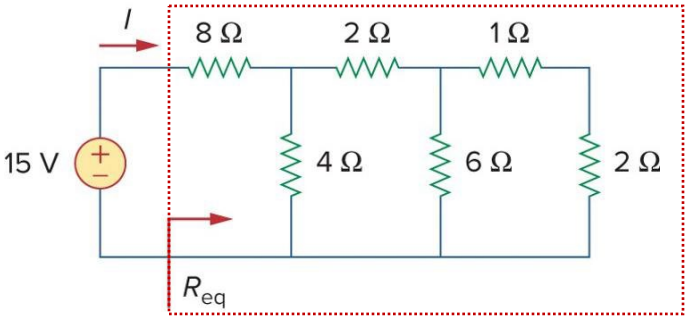
9. Find i and V_o in the circuit below.



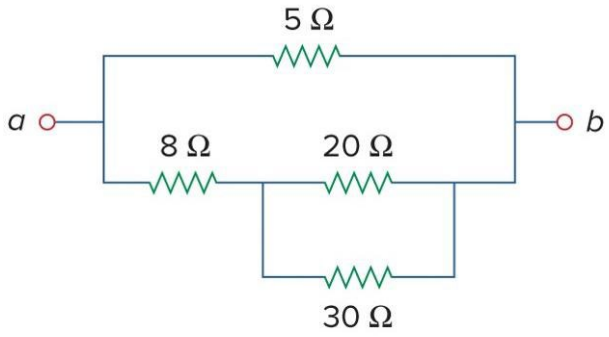
10. Find R_{eq} and i_o in the following Circuit.



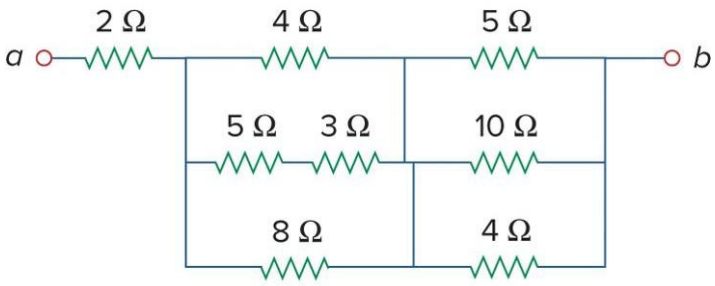
11. For the ladder network below, find I and R_{eq}.



12. Reduce each of the following circuits to a single resistor between terminals *a*-*b*.

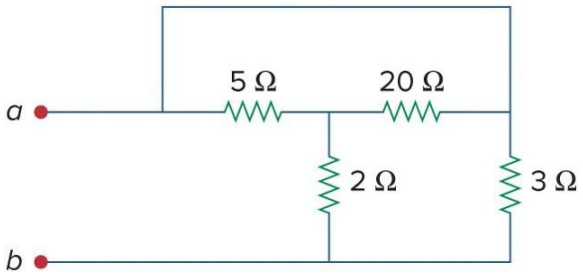


(a)



(b)

13. For the circuit below, obtain the equivalent resistance at terminals a-b.



14. Find I in the following circuit.