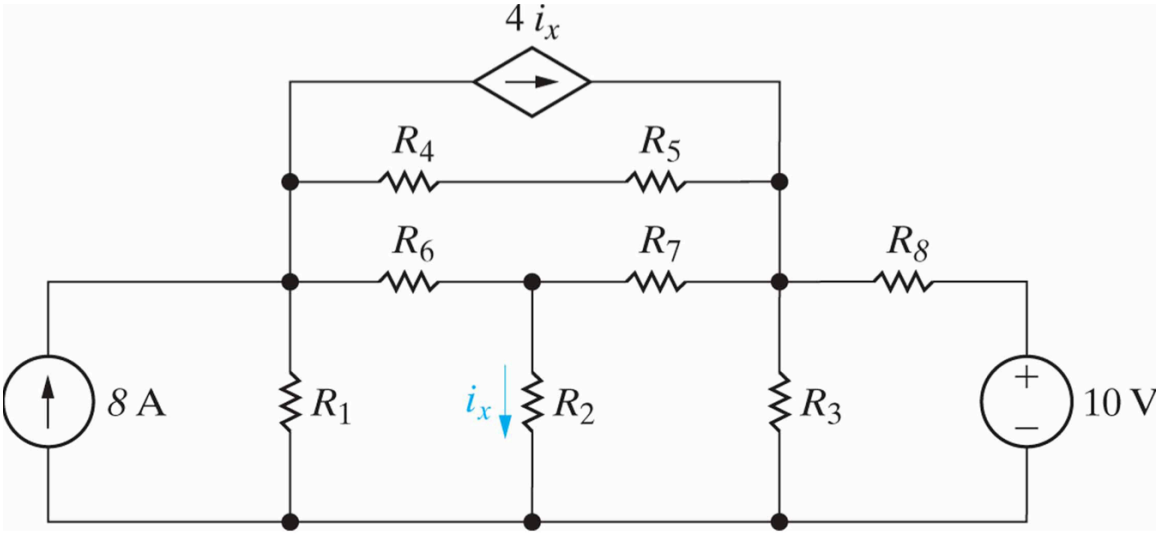
Problem # 1

For the circuit shown in the Figure, state the numerical value of the number of (a) branches, (b) branches where the current is unknown, (c) essential branches, (d) essential branches where the current is unknown, (e) nodes, (f) essential nodes, and (g) meshes.

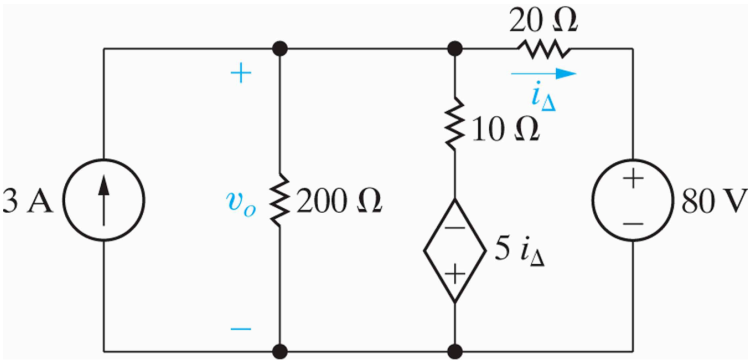


Problem #2

a) Use the node-voltage method to find v_o in the circuit.

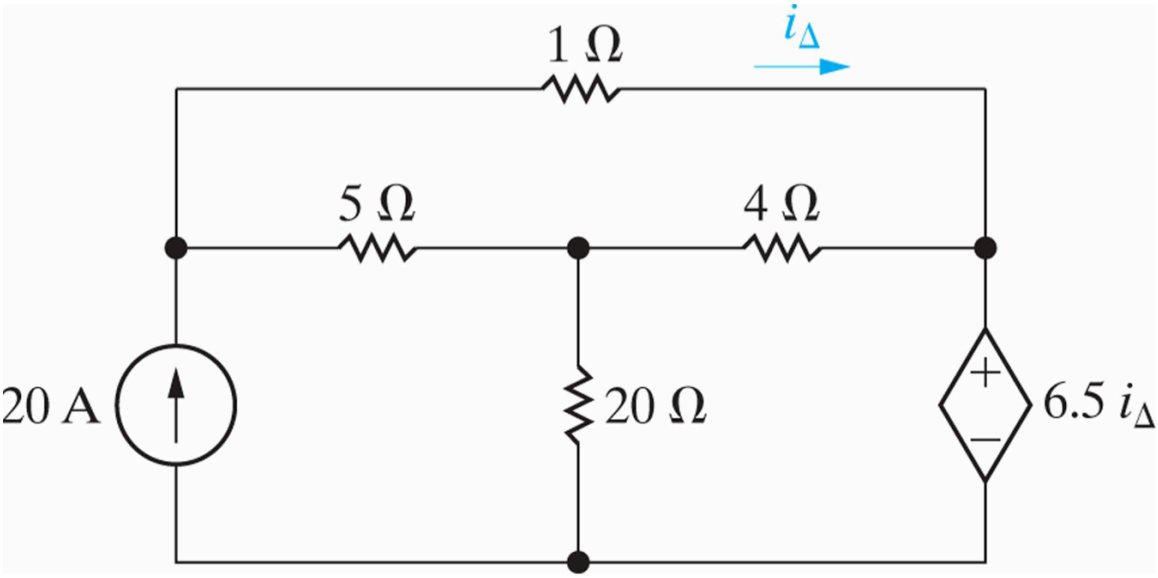
b) Find the power absorbed by the dependent source.

c) Find the total power developed by the independent sources.



Problem #3

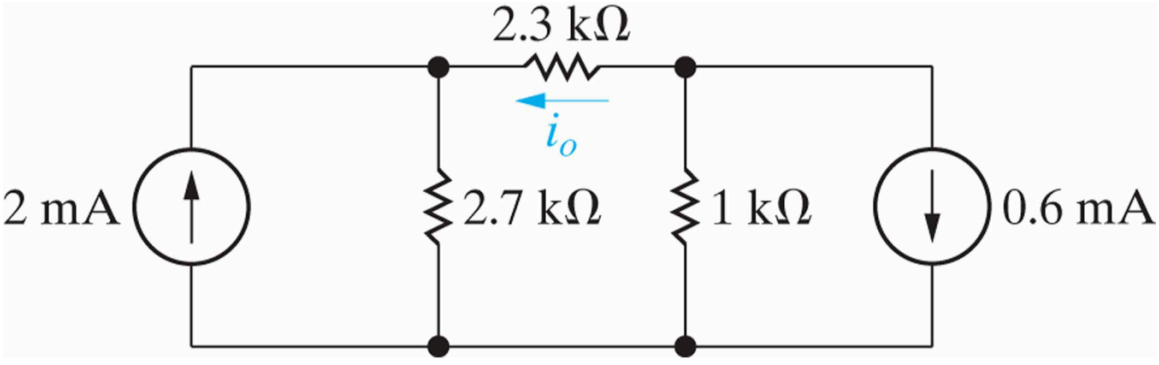
Use the mesh-current method to find the total power developed in the circuit.



Problem #4

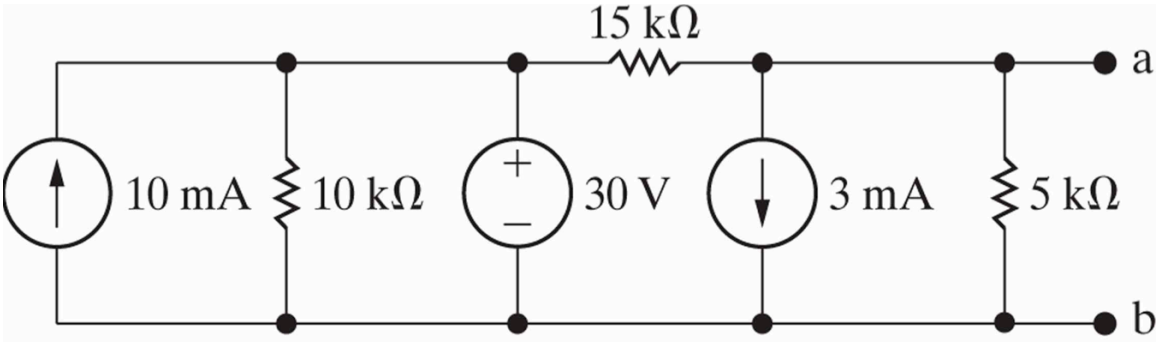
a) Use a series of source transformations to find the current i_o in the circuit.

b) Verify your solution by using the node-voltage method to find i_0.



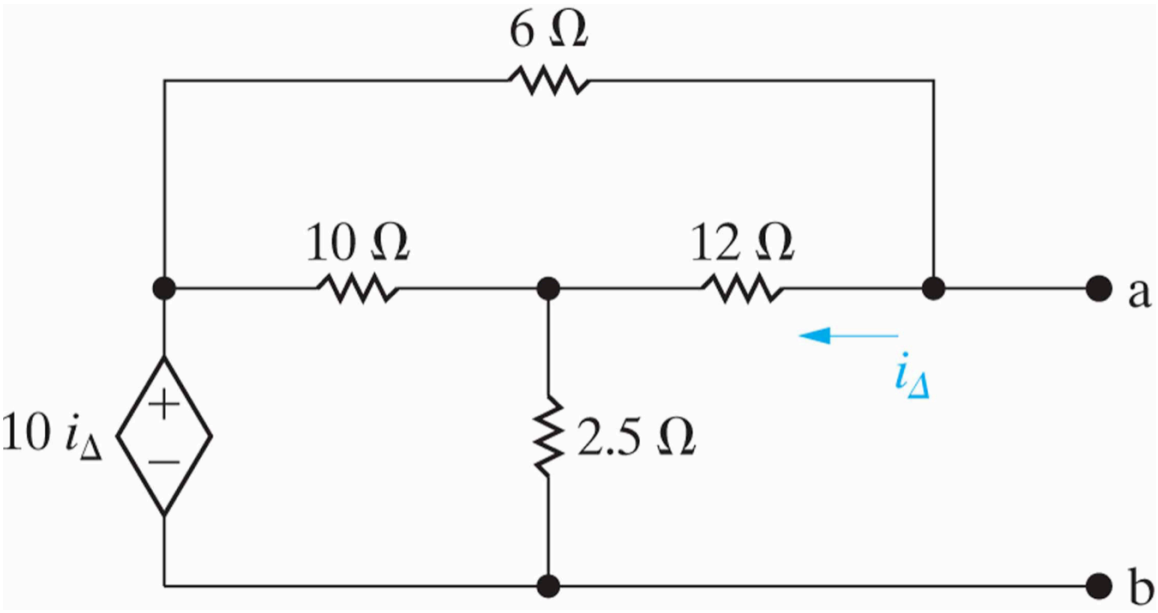
Problem #5

Find the Norton equivalent with respect to the terminals a, b in the circuit.



Problem #6

Find the Thevenin equivalent with respect to the terminals a, b in the circuit.



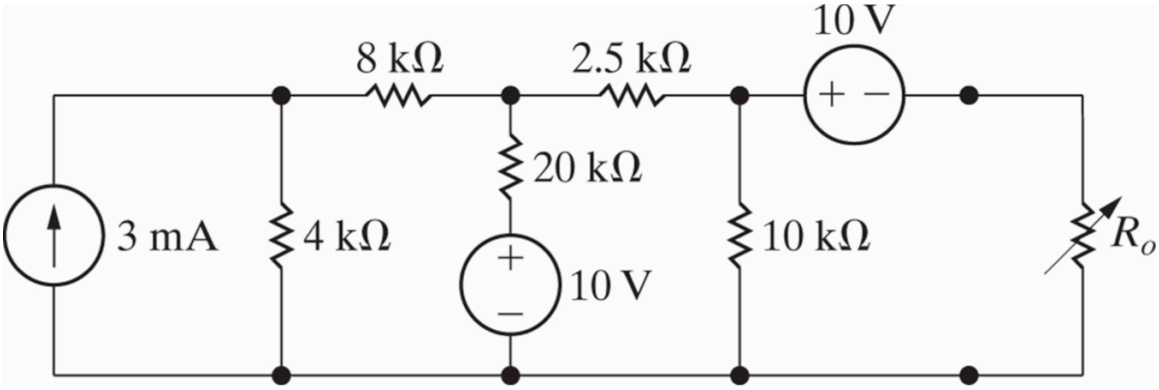
Problem #7

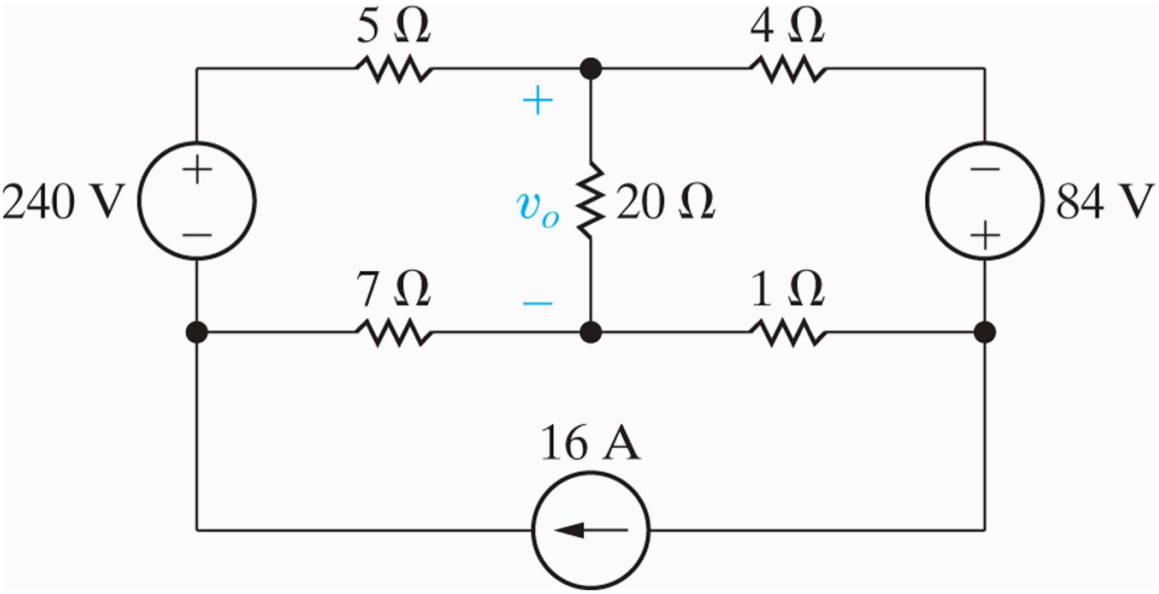
The variable resistor in the circuit is adjusted for maximum power transfer to R_o.

a) Find the value of R_o.

b) Find the maximum power that can be delivered to R_o.

c) Find a resistor in Appendix H closest to the value in part (a). How much power is delivered to this resistor?



Problem #8

Use the principle of superposition to find the voltage v_o in the circuit.