

EE40 Homework #2

Due September 17 (Thursday), 12:00 noon in Cory 240

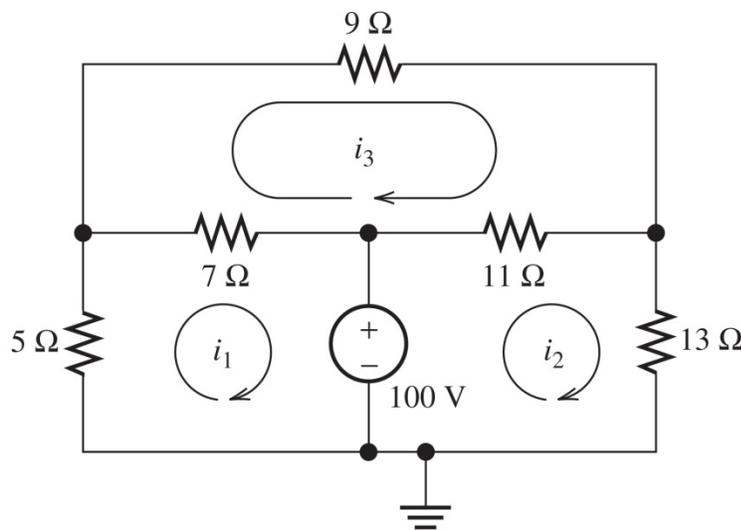
Reading Assignments

Chapter 2 of Hambley textbook

Chapter 14.1, 14.2, and 14.3 of Hambley textbook

Problem 1: Mesh Analysis (Hambley P2.62)

Solve for the power delivered by the voltage source in Figure P2.62 (below), using the mesh-current method.



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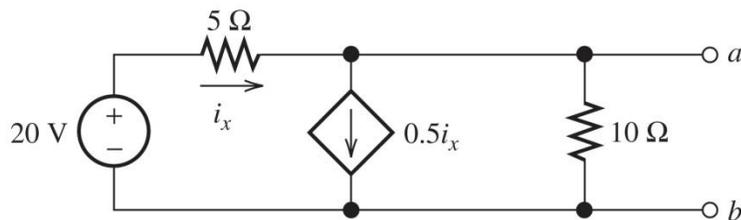
Problem 2: Thevenin Equivalent Circuit (Hambley P 2.82)

If we measure the voltage at the terminals of a two-terminal network with two known (and different) resistive loads, we can determine the Thévenin and Norton equivalent circuits.

When a 7-Ω load is attached to a two-terminal circuit, the load voltage is 7 V. When the load is increased to 10 Ω, the load voltage becomes 8 V. Find the Thévenin voltage and resistance for the circuit.

Problem 3: Thévenin and Norton Equivalent Circuits (Hambley P2.83)

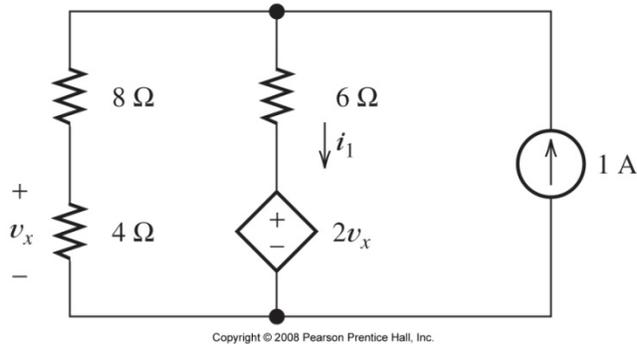
Find the Thévenin and Norton equivalent circuits for the circuit shown in Figure P2.83 (below).



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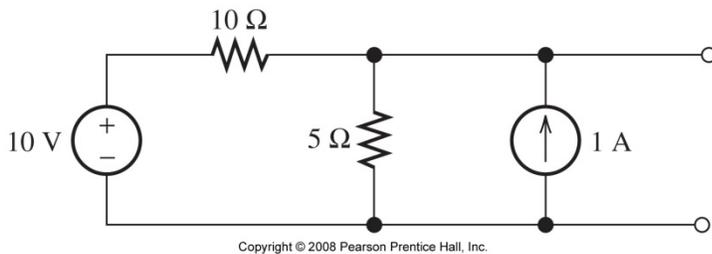
Problem 4: Principle of Superposition (Hambley P2.100)

Use superposition to solve for i_1 in the circuit of Figure P2.100 (below). In this case, the controlled source is a voltage source, so replace it with an independent voltage source before applying superposition.



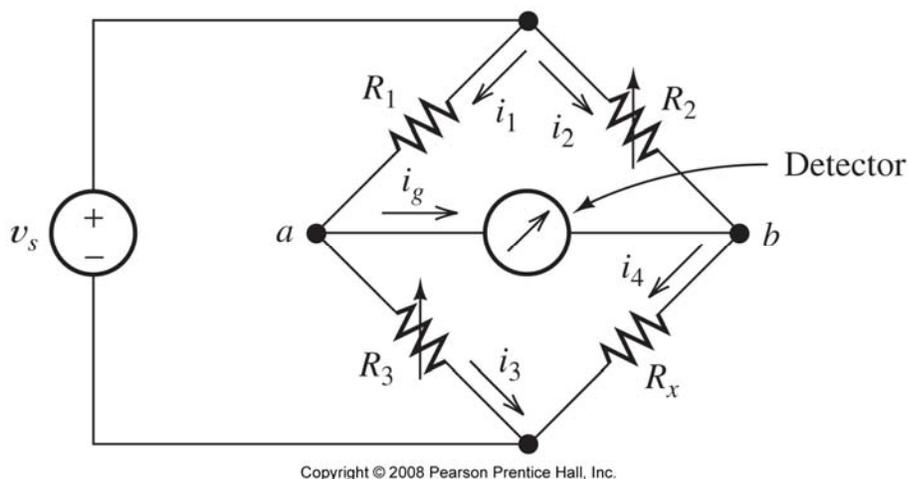
Problem 5: Maximum power transfer (Hambley P2.84)

Find the maximum power that can be delivered to a resistive load by the circuit shown in Figure P2.75 (below). For what value of load resistance is the power maximum?



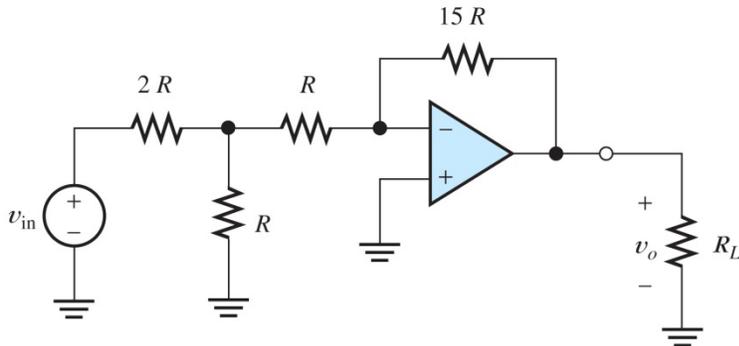
Problem 6: Wheatstone Bridge (Hambley P2.104)

Derive expressions for the Thévenin voltage and resistance “seen” by the detector in the Wheatstone bridge in Figure 2.64 (below). (In other words, remove the detector from the circuit and determine the Thévenin resistance for the remaining two-terminal circuit.) What is the value of the Thévenin voltage when the bridge is balanced?



Problem 7: Op amp - Inverting Amplifier (Hambley P14.11)

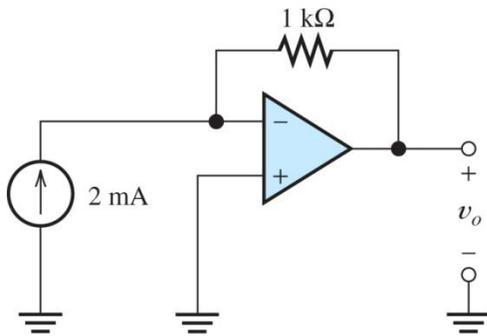
Determine the closed-loop voltage gain of the circuit shown in Figure P14.11 (below), assuming an ideal op amp.



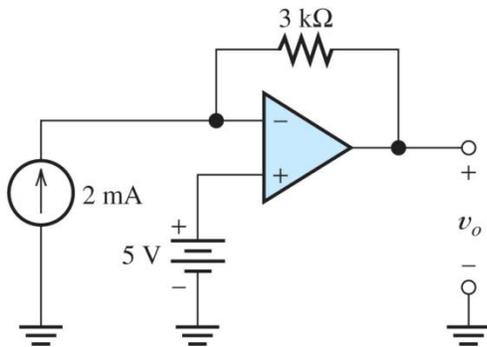
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Problem 8: Op Amp - Noninverting Amplifier (Hambley P14.20)

For each of the five circuits shown in Figure P14.20 (below), assume that the op amp is ideal and find the value of v_o . Each of the circuits has negative feedback, so the summing-point constraint applies.

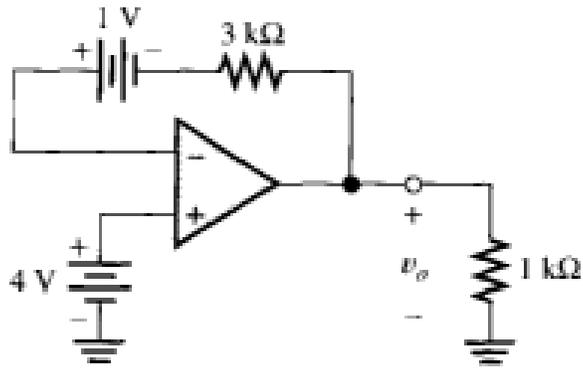


(a)

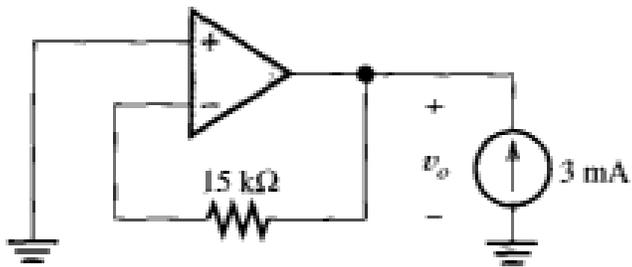


(b)

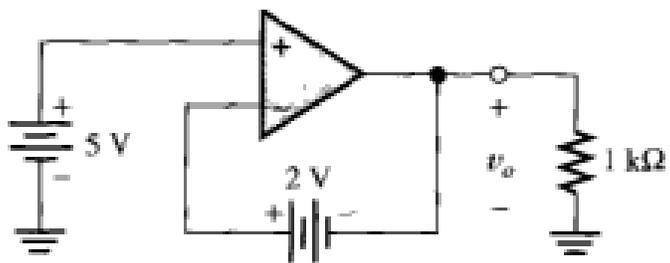
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(c)



(d)



(e)

Figure P14.20