EE 110 Basic Electrical Engg - HW I

August 11, 2010

1. Use Ohm's law and Kirchhoff's law to find the value R in the circuit shown in figure P1.1

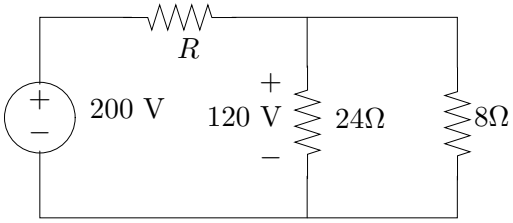
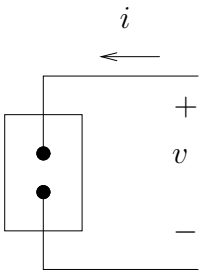


Figure P1.1



v V	i A
100	0
180	4
260	8
340	12
420	16

Figure P2.1

2. The terminal voltage and terminal current were measured on the device shown in figure P2.1. The values of v and i are as given in the table. Use these to plot v vs. i and compute the equation of the line. Use the equation to construct a circuit model for the device using an ideal voltage source and a resistor. Further, use the model to predict the power that the device will deliver to a 20 Ω resistor.

3. The voltage and current at the terminals of an automobile battery during a charge cycle are shown in figure P3.1. Calculate the total charge transferred to the battery.

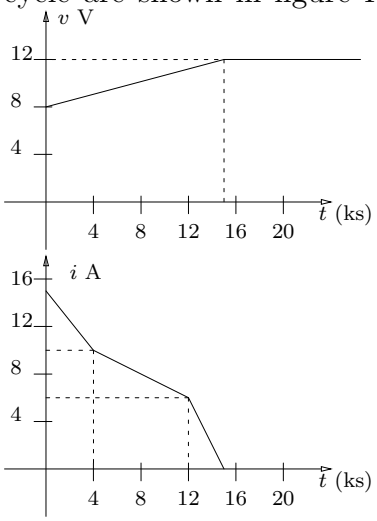


Figure P3.1

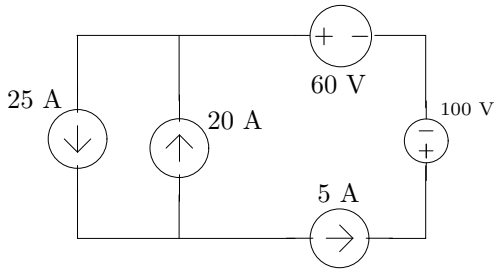


Figure P4.1

4. If the interconnection in figure P4.1 is valid, find the total power delivered/consumed by each source in the circuit. If the interconnection is not valid, explain why.

5. For the circuit shown in figure P5.1 determine v_0. Find the power delivered by (i) the 300 V source and (ii) 10 A source. Check to see if the total power delivered equals the total power consumed.

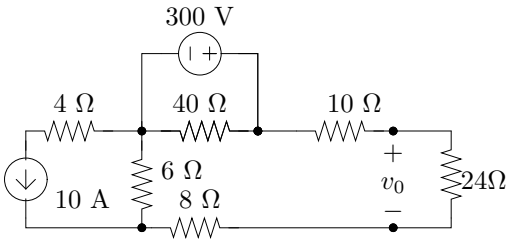


Figure P5.1

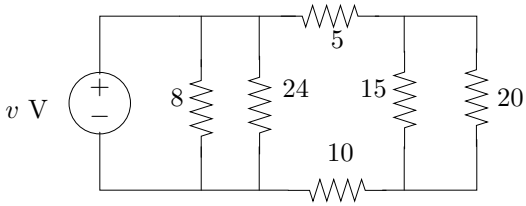


Figure P8.1

6. An electric heater draws 1000 W from a 250-V source. How much power does it take from a 200-V source? What is the value of the resistance of the heater?

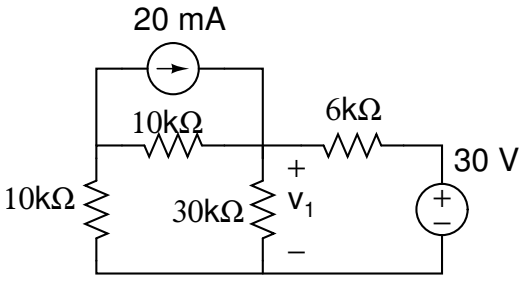
7. A blackbox contains an ideal voltage source and an ideal current source connected in parallel. What is the overall behavior of this blackbox? That of a current source? Voltage source? Or, both?

8. For the circuit shown in figure P8.1, find the value v in V that will dissipate 180 W in the 20-Ω resistance. Values of the resistances shown are in Ohms. Further, determine the power delivered by the source.

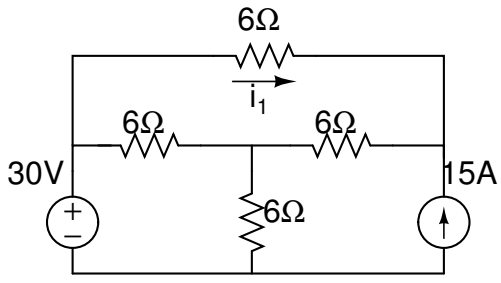
9. Show how you could connect five 5Ω resistors, to get (a) $R_{eq} = 4\ \Omega$, and (b) $R_{eq} = 6\ \Omega$, *all five resistors being connected* in each case.

10. Use the superposition theorem to find the voltage v_1 in fig P10.1(a).

    Use the superposition theorem to find the current i_1 in fig P10.1(b).



P10.1 (a)



P10.1 (b)

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