EE42/100 Spring 2006 Problem Set 2

Issued: Jan 26, 2006 Due: Feb 3, 2006

Please remember that homeworks are due at 12:00 noon Friday, February 3rd. Please put your homework in the appropriate box (EE42 or EE100) in 240 Cory Hall. Print your name(s) in upper right corner of your paper and indicate whether you're enrolled in EE42 or EE100.

1. *(Reading Assignment)* Chapter 2: Hambley 3rd edition.

2. *(Ideal Independent Sources)* Find the currents I_1, I_2, and I_3 in the circuit shown.

3. *(Ohm's Law)* Find the currents marked "I" in the circuits shown.

4. *(Equivalent Resistance)* Find the resistance between terminals A and B in the circuit shown. Assume $R_1 = 5.6\ \text{k}\Omega$, $R_2 = 4.7\ \text{k}\Omega$, $R_3 = 3.3\ \text{k}\Omega$, and $R_4 = 8.2\ \text{k}\Omega$.

5. *(Ohm's Law, Kirchhoff's Current Law)* In the following circuit, what is the current I_1 through the 100 Ω resistance? What is the current I_2 through the voltage source?

6. *(Power)*
   a. Two resistors, R_1 and R_2, are connected in parallel inside a larger circuit. The total power dissipated in both resistors is P. What is the power dissipated in R_1?
   b. Repeat part (a), assuming that the two resistors are connected in *series*.

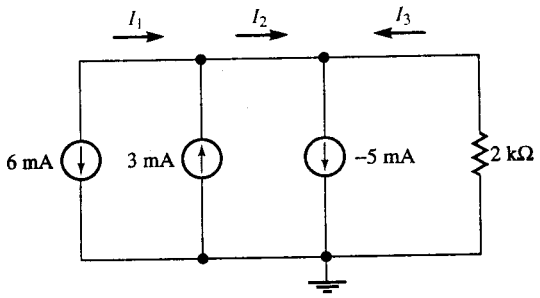
7. *(Node Analysis)* In the provided circuit, calculate the voltage V_1 by the node method. Let $I_0 = 1.4\ \text{mA}$, $R_1 = 2.7\ \text{k}\Omega$, $R_2 = 2.7\ \text{k}\Omega$, and $R_3 = 3.3\ \text{k}\Omega$.

8. *(Loop Analysis)* In the same circuit as Problem 7, calculate the voltage V_1 by the loop method. Use the same numerical values.

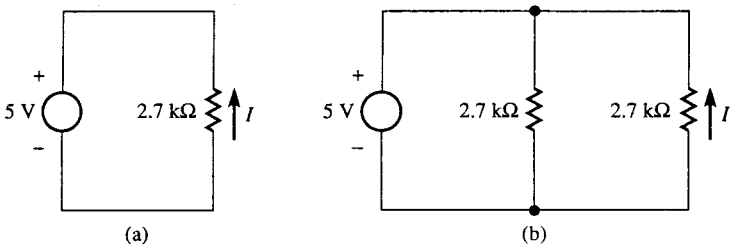
9. *(Node Analysis)* Find the current *I1*, as indicated in the following circuit, by the node method. Let $I_0 = 55\ \text{A}$, $R_1 = 2\ \Omega$, $R_2 = 1.5\ \Omega$, $R_3 = 4.0\ \Omega$, $V_0 = 110\ \text{V}$.

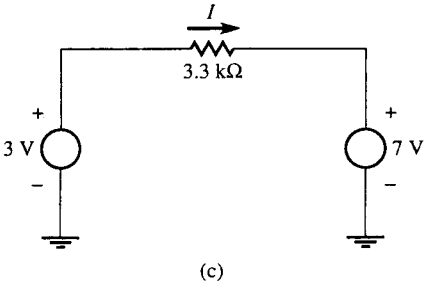
10. *(Loop Analysis)* Examine the provided circuit.
    a. How many nodes are present?
    b. How many branches?
    c. How many mesh currents are required to analyze this circuit?

Problem 2

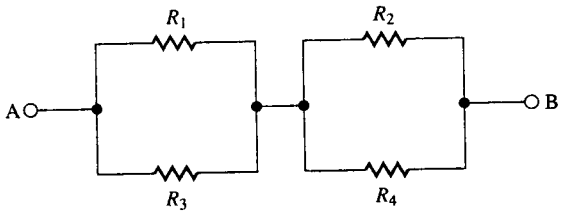


Problem 3

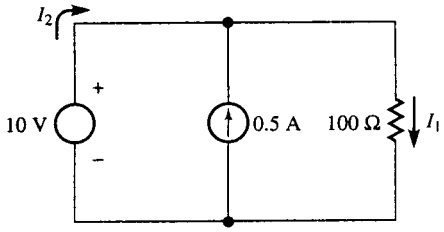




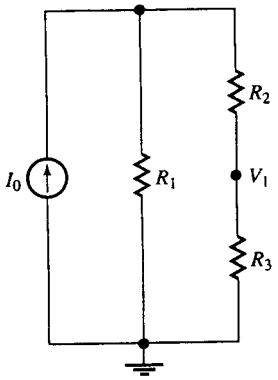
Problem 4



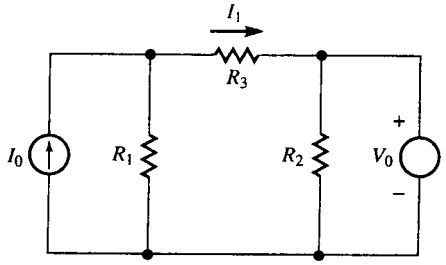
Problem 5



Problem 7, 8



Problem 9



Problem 10