دانشکده مهندسی مکانیک

تمرین درس مبانی برق ۱

نام و شماره دانشجویی:

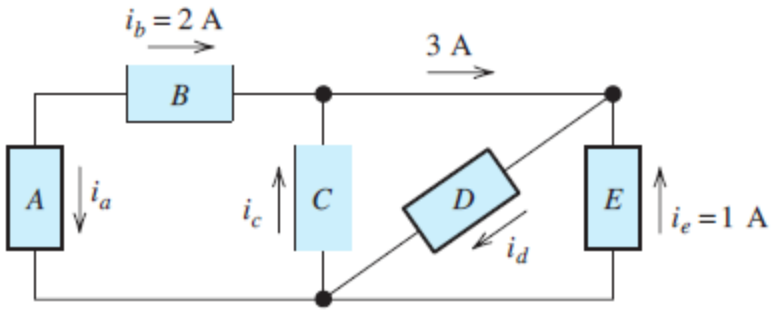
Introduction to Electrical Engineering Exercises

Chapter 1 – Introduction

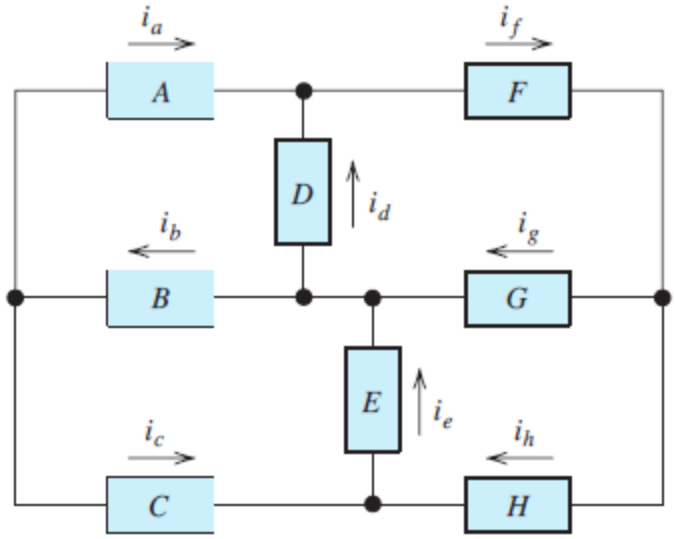
***P1.9.** The net charge through a cross section of a circuit element is given by $q(t) = 2t + t^2$ C. As usual, t is in seconds. Find the current through the element in amperes.

***P1.17.** A typical "deep-cycle" battery (used for electric trolling motors for fishing boats) is capable of delivering 12.6 V and 10 A for a period of 10 hours. How much charge flows through the battery in this interval? How much energy does the battery deliver?

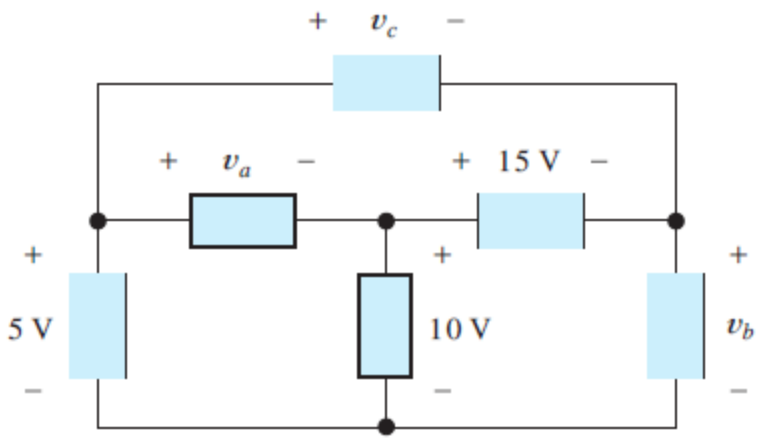
***P1.36.** Use KCL to find the values of i_a, i_c, and i_d for the circuit of Figure P1.36. Which elements are connected in series in this circuit?



***P1.37.** Given that $i_a = 2\,\text{A}$, $i_b = 3\,\text{A}$, $i_d = -5\,\text{A}$, and $i_h = 4\,\text{A}$, determine the values of the other currents in Figure P1.37.



***P1.41.** Use KVL to solve for the voltages v_a, v_b, and v_c in Figure P1.41.



***P1.42.** Use KVL and KCL to solve for the labeled currents and voltages in Figure P1.42. Compute the power for each element and show that power is conserved (i.e., the algebraic sum of the powers is zero).

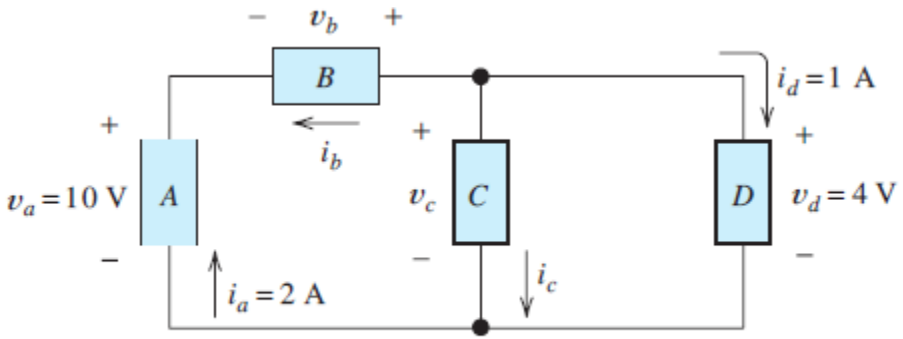
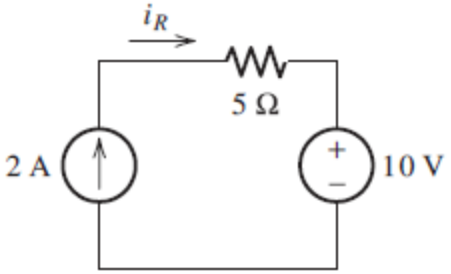
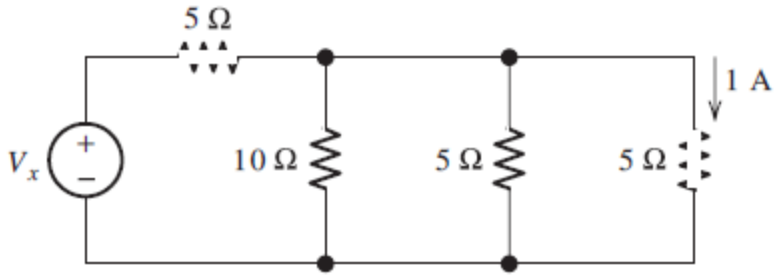


Figure P1.42

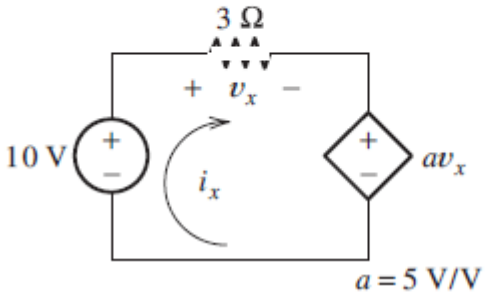
***P1.63.** Consider the circuit shown in Figure P1.63. Find the current i_R flowing through the resistor. Find the power for each element in the circuit. Which elements are absorbing power?



***P1.64.** Consider the circuit shown in Figure P1.64. Use repeated applications of Ohm's law, KVL, and KCL to eventually find V_x.



***P1.69.** The circuit shown in Figure P1.69 contains a voltage-controlled voltage source. **a.** Use KVL to write an equation relating the voltages and solve for v_x. **b.** Use Ohm's law to find the current i_x. **c.** Find the power for each element in the circuit and verify that power is conserved.



***P1.70.** What type of controlled source is shown in the circuit of Figure P1.70? Solve for v_s.