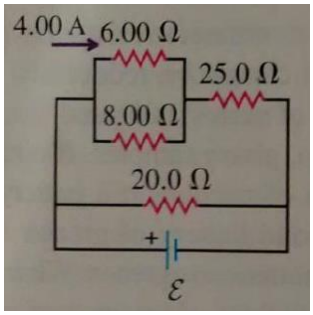
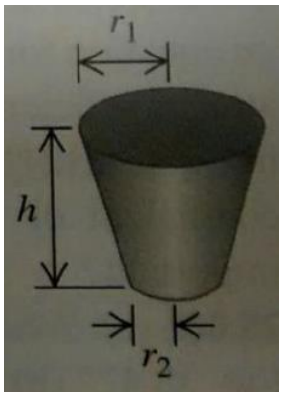
D1.



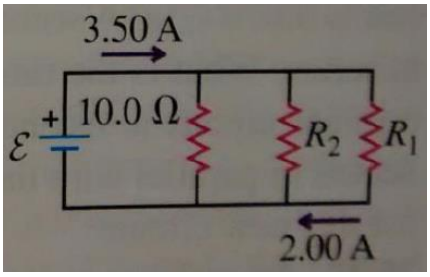
Consider the circuit shown in the figure. The current through the 6.00-Ω resistor is 4.00 A, in the direction shown. What are the currents through the 25.0-Ω and 20.0-Ω resistors?

D2.



A material of resistivity ρ is formed into a solid, truncated cone of height h and radii r_1 and r_2 at either end (as shown in Fig.). (a) Calculate the resistance of the cone between the two flat end faces. (Hint: Imagine slicing the cone into many thin disks, and calculate the resistance of one such disk followed by connecting them in series to determine the overall resistance). (b) Show that your result agrees with $R = \frac{\rho L}{A}$ when $r_1 = r_2$.

D3.



In the circuit shown in the figure, the rate at which R_1 is dissipating electrical energy is 20.0 W. (a) Find R_1 and R_2. (b) What is the emf of the battery? (c) Find the current through both R_2 and the 10.0-Ω resistor. (d) Calculate the total electrical power consumption in all the resistors and the electrical power delivered by the battery. Show that your results are consistent with conservation of energy.