PHYSICS 201
ASSIGNMENT 4

DUE: 10/20/17 (Friday)

READING
Chapter 8, Sects 1 - 4
Chapter 9, Sects 1, 3, 4, 5

PROBLEMS
Chapter 8:  55, 62, 65
Chapter 9:  23, 91 (some of the answers to these two problems given in the back of the book are incorrect. The correct answers are given below).

Also do the following extra problems:

(I) Suppose you wish to make a uniform wire of resistance 0.500 Ω from 1.00 g of copper. If all the copper is to be used, what must be (a) the length and (b) the diameter of this wire? Copper has a resistivity of $1.68 \times 10^{-8}$ Ω.m and a mass density of $8.92 \times 10^3$ kg/m$^3$.

(II) An engineer wishes to construct a resistor with a zero overall temperature coefficient of resistance at 20.0°C. She designs a pair of circular cylinders, one of carbon and one of Nichrome as shown in the figure. What is the ratio of the lengths $l_1$ and $l_2$ of each segment if the overall resistance $R_1 + R_2$ is independent of temperature? Ignore thermal expansion. The resistivity and the temperature coefficient of resistivity are respectively $1.00 \times 10^{-6}$ Ω.m and $0.400 \times 10^{-3}/°C$ for Nichrome, and $3.50 \times 10^{-5}$ Ω.m and $-0.500 \times 10^{-3}/°C$ for carbon.

ANSWERS TO PROBLEMS
Chapter 8
62.  (a) 10.1 V; (b) 2.25

Chapter 9
23.  $7.50 \times 10^{19}$
91.  (a) 0.870 A; (b) $2.54 \times 10^{23}$; (c) $1.32 \times 10^2$ Ω; (d) $4.68 \times 10^6$ J

(I)  (a) 1.83 m; (b) $2.79 \times 10^{-4}$ m
(II)  43.8