Homework #3 (due on 02/13)

Boas Chapter 7
3.8; 4.11; 5.1; 6.1; 7.1; 8.1; 9.15; 9.23; 10.4; 10.5;

Extra-credit problem – Relaxation oscillator

The capacitor shown in the figure is charged by the battery and discharges through the light bulb when the potential across is equal 0.9V. Assuming that the capacitor discharges very rapidly, sketch the potential across the capacitor as a function of time and show that it is equal $V_C = V(1 - e^{-t/RC})$, $0 < t < RC \ln(10)$, and repeats periodically with period $RC \ln(10)$. Find the Fourier series with period $T$ that represents this function.