

# Physics 110B, Problem Set 3

Due Friday, January 31, 11:59 pm

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To help out with grading, please circle your final answers.

**1 Griffiths Problem 7.57 5th edition, 7,54 4th edition**

**2 Griffiths Problem 8.15 5th edition, 8.13 4th edition**

Only parts (a) and (b) in the 5th edition. In the 4th edition, part (a) and the first half of part (b), *i.e.* just calculate  $I^2R$ .

**3 Griffiths Problem 9.2, same in the two editions**

**4**

The centers of two circular metal plates forming a parallel plate capacitor, initially charged to voltage  $V_0$ , are connected internally by a straight fine wire of radius  $a$ , length  $L$ , and conductivity  $\sigma$ .

(a) Calculate the pointing vector (magnitude and direction) at the surface of the wire.

(b) Show that as the capacitor discharges from  $V = V_0$  to  $V = 0$  the total energy flowing into the wire is  $E = \frac{1}{2}CV^2$ , where  $C$  is the capacitance.

You can ignore the displacement current through the wire, which turns out to be a good approximation as long as the discharge of the capacitor is slow enough.