Physics 110B, Problem Set 3

Due Wedenesday, October 23, 11:59pm

Upload to Gradescope
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

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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 σ.
(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.