Homework 11

Due Thursday 5/2/2013 - at beginning of class

Griffiths' 4 Problems

7.18

7.26 (Griffiths 3rd Edition 7.24)

7.28 (Griffiths 3rd Edition 7.26)

7.30 (Griffiths 3rd Edition 7.28)

7.36 (Griffiths 3rd Edition 7.33)

8.1 Ex. 7.13 only

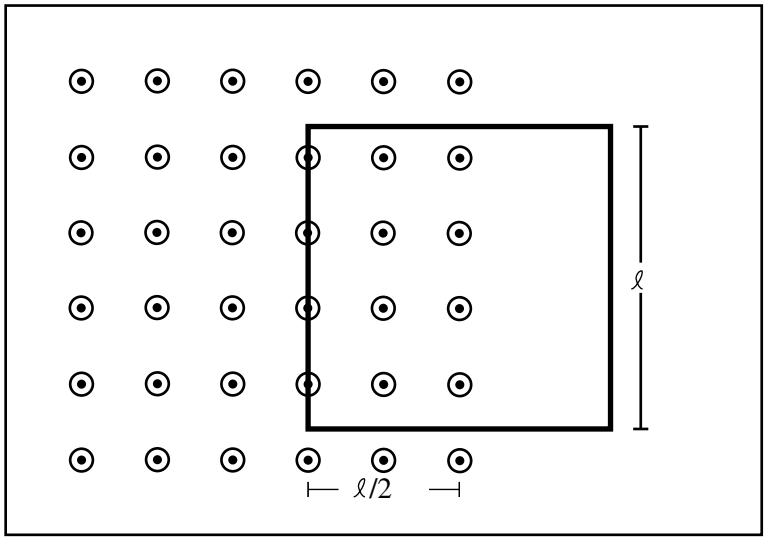
8.4 (a) only

8.7 (Griffiths 3rd Edition 8.5)

Additional Problems

Problem E.11.1 Consider two concentric strongly conducting spherical shells where the smaller has outer radius a and the larger inner radius c. The volume between the shells is filled with two weakly conducting materials. The space from $r = a$ to $r = b$ contains a material with conductivity σ_1. The space from $r = b$ to $r = c$ contains a material with conductivity σ_2. Compute the resistance between the shells (between $r = a$ and $r = c$). Note, $a < b < c$.

Problem E.11.2 An aluminum square with resistivity $2.65 \cdot 10^{-8}\Omega$m is placed halfway inside a magnetic field. The magnetic field is being turned off and the magnitude of the field obeys $B_0 e^{-t/\tau}$ where $\tau = 2$s and $B_0 = 0.2$T. The aluminum square has side length $\ell = 2$cm and cross-sectional area $A = 1cm^2$. Compute the force exerted on the loop at time $t = 0$. Does the force tend to push the loop out of the field or draw the loop into the field?



Problem E.11.3 The region between $z = -a$ and $z = +a$ contains a changing electric field $\vec{E} = E_0 \sin(\omega t)\hat{x}$. Compute the magnetic field at points $z > a$.