Review for Test #3

- Responsible for:
  - Chapters 14, 15, and 16 (23, S3, and 13 by default)
  - Notes from class
  - Problems worked in class
  - Homework assignments
- Test format:
  - 4 problem (15 points each), 1 (30 points)
  - 1 bonus problem (5 points each)
  - 3 conceptual questions (10 points total)
  - Time: 75 minutes
- Test materials:
  - Pencil, eraser, and non-programmable calculator
  - No formulae sheet or paper; all provided
  - Closed textbook and notes

Material Covered

- Chapter 14: Electric Fields in Matter
  - properties of materials (insulators, …)
  - charging/discharging materials
  - polarization of atoms, polarizability
  - polarization of insulators/conductors
  - charge diagrams, ion/electron drift speed, mobility
  - atom-dipole forces
- Chapter 15: E Fields for Charge Distributions
  - continuous distributions (linear, 2D, 3D)
  - electric field integral and charge elements
  - analytic solutions of thin rods, rings, disks, solid spheres
  - parallel-plate capacitor

Material Covered

- Chapters 16: Electric Potential
  - potential energy and electric potential difference
  - electric potential due to point charges and charge distributions
  - equipotential surfaces
  - the electric field from the electric potential
  - dielectric constant, field energy density

Example Problem

LON-CAPA HW 6, problem 3 - the charged sheet and rod.

Problem P56 (Chap. 14)

A neutral solid metal sphere of radius 0.1 m is at the origin, polarized by a point charge of 6.0e-8 C at location <-0.3,0,0> m. At location <0,0.07,0> m, what is the electric field contributed by the polarized charges on the surface of the metal sphere? How do you know?

Problem P61 (Chap. 16)

A thin spherical glass shell of radius R carries a uniformly distributed charge +Q, and a thin spherical plastic shell of radius R carries a uniformly distributed charge -Q. The surfaces of the spheres are a distance L+2d from each other, and locations A and B are a distance d from the surfaces of the spheres. Calculate the potential difference V_B-V_A.