Review for Test #2

- Responsible for:
  - Chapters S3 and 13
  - Notes from class and online
  - Problems worked in class (including group assignments)
  - Homework assignments (EOC and LON-CAPA)
- Test format:
  - 1 problem (30 points), 4 problems (15 points each)
  - 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

Rules for the Test

- You **must show all work** to receive credit
- At least one empty seat between each student
- No talking during test, except to proctor or instructor
- Put name and 810/811 number on test sheet
- Bring Student ID - show proctor
- All electronics turned **off** (phones, tablets, computers, Apple watch, etc.), except simple calculator
- Proctor is watching!

Material Covered

- Chapter S3: Diffraction
  - Young's double slit experiment (bright and dark fringes)
  - two slit intensity distribution
  - diffraction gratings
  - Michelson interferometer
  - single slit diffraction (dark/bright fringes)
  - single slit diffraction intensity, phasor diagrams
  - resolution limits, slits and circular apertures
  - grating resolving power
  - x-ray diffraction

- Chapter 13: Electric Fields
  - electric charge, the Coulomb force
  - the electric field due to point charges and dipoles
  - electric field lines

- electric dipole moment
- uniformly charged spherical conductor

Chap. 13, P54

The dipole moment of the HF (hydrogen fluoride) molecule has been measured to be 6.3e-30 C.m. If we model the dipole as having charges +e and -e separated by a distance s, what is s? Is this plausible?

Chap. 13, P65

You make repeated measurements of the electric field **E** due to a distant charge, and you find it is constant in magnitude and direction. At a later time (call it t=0), another student moves the charge. You continue to make measurements of **E** with no change until at t=45 ns, you observe a sudden change in **E**. How far away was the charge originally?