

## Information on the first midterm

The first midterm will be held in class (136 Loomis) on Friday, February 22. The exam is open book, and open notes. There are three problems covering the first two lecture note chapters on Gauss's Law and Potentials. Work the three problems in the examination booklets and box your final answer. Partial credit will be given if I can follow your work. No calculator will be necessary. If you will arrive on time for the exam you will have 50 minutes to work the exam.

### How to prepare for the first hourly.

The best way is to review all of the homework and posted homework solutions with the following in mind.

1. Be familiar with spherical, cylindrical, and Cartesian coordinates and the formulas for surface areas and volumes of spherical and cylindrical systems.
2. Know how to compute the electrical field from Coulomb's Law. Know how to compute the electric field from spherically symmetric and cylindrically symmetric charge distributions and the infinite plane of charge using Gauss's law. Know how to compute the electrical field when these various charge distributions are superimposed.
3. Know how to calculate the curl, and divergence of electric fields in various coordinate systems and know what these quantities mean.
4. Know how to calculate the voltage  $V(\vec{r})$  and the charge density  $\rho(\vec{r})$  given an electric field  $\vec{E}(\vec{r})$ . Know how to check your result by taking the gradient of the potential in various coordinate systems.
5. Know how to calculate the energy stored in electrical fields or charge distributions.

**A practice problem will be discussed during one of the lectures to help you prepare for the 1<sup>st</sup> midterm.**