Rubric for Exam 3:

1. Understand the relationship between the induced dipole moment of an atom and the external electric field.
2. Be able to calculate the force on a dipole in a non-uniform electric field.
3. Understand that the calculation of the voltage from a volume of dipoles results in an expression, in terms of bound charge, which is analogous to that we obtained in chapter 2 for the voltage from a free charge distribution.
4. Be able to calculate the bound charge given $\vec{\mathbf{P}}$.
5. Have a rudimentary physical understanding of the how the bound charge is related to $\vec{\mathbf{P}}$.
6. Understand that the induced dipoles have an effect on each other (feedback) in determining the final bound charge distribution.
7. Be able to apply Gauss's law for $\vec{\mathbf{D}}$ to find $\vec{\mathbf{E}}_{tot}$ in a dielectric.
8. Be able to apply constant voltage, constant charge, or constant capacitance in determining how the other parameters vary in dealing with a capacitor.
9. Understand how, starting from the work-energy theorem, the force on dielectric in electric fields can be calculated.

10. Be able to find an integral expression for $\vec{F}$ on a moving charge distribution (line, surface, or volume) given that distribution and $\vec{B}(x, y, x)$.
11. Be able to write an integral expression for $\vec{B}$ given a non-symmetric $\vec{J}$ or be able to use Ampere's law to find $\vec{B}$ for a symmetric distribution.
12. Be able to apply Stokes theorem using simple paths in different coordinate systems.
13. Be able to find $\vec{A}$ given $\vec{J}$ or $\vec{B}$ given $\vec{A}$.
14. Be able to apply conservation of charge in a magneto-static case.