Rubric for Exam 3:

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

9. Understand that the electric field from a charge moving at constant speed is compressed while acceleration of the charge leads to waves in the electric field which decrease in amplitude with distance.
10. Be able to find an integral expression for $\vec{F}$ on a moving charge distribution ($\vec{I}$, $\vec{K}$, or $\vec{J}$) 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 and the divergence theorems to determine boundary conditions for $\vec{B}$.
13. Understand the direction of $\vec{A}$ given $\vec{J}$
14. Be able to find $\vec{A}$ given $\vec{J}$ or $\vec{B}$.