Rubric for Final

Main themes: problem solving strategy and application of math concepts associated with flux and line integration, Stokes and the divergence theorems.

1. Be able to apply Ohms law $\vec{J} = \sigma\vec{E}$ (e.g. the homework problem on current in the body) and understand how Ohms law can lead to Laplace's equation.

2. Be able to demonstrate a fundamental understanding of the separation of variables method of solving PDE's.

3. Understand when to apply Ampere's, Lenz's, and Faraday's laws and identify the appropriate line and surface integrals associated with these laws.

4. Be able to calculate energy stored in the electric and magnetic fields in a given volumes.

5. Understand how to apply Newton's laws to determine the motion of charges in the presence of electric and magnetic fields.

6. Be able to apply and explain conservation laws (charge, energy, etc.). Be able to explain conservation of charge in integral and differential form.

7. Be able to apply $\vec{\nabla} \cdot \vec{E} = \rho/\epsilon_0$ and $\vec{\nabla} \cdot \vec{B} = 0$ in both differential and integral form.

8. Understand how to calculate inductances and their application in a circuit.

9. Be able to apply the triangle diagrams for $\vec{E}, V, \rho, \vec{B}, \vec{A}, \vec{J}$.