IPA and two large Kimtechs.

1 Lectures 1 and 2

	Perpendicular Boundary Conditions	Parallel Boundary Conditions
Electric Field Bdry Cdtns	$\left(\vec{E}_1 - \vec{E}_2\right) \cdot \vec{n} = \frac{\sigma}{\epsilon_0}$	$\left(\vec{E}_1 - \vec{E}_2\right) \cdot \vec{t} = 0$
Magnetic Field Bdry Cdtns	$\left(\vec{B}_1 - \vec{B}_2\right) \cdot \vec{n} = 0$	$\left(\vec{B}_1 - \vec{B}_2\right) \cdot \vec{t} = \mu_0 \vec{J}$

2 Lecture 3

$$\vec{A} = \frac{\mu_0}{4\pi} \int\limits_{current} \frac{\vec{J}}{r} dV$$

$$d\vec{B}(P) = \frac{\mu_0}{4\pi} I dl \frac{\vec{t} \times \vec{r}_{QP}}{r_{QP}^3}$$

3 Lecture 4

Solving for the vector potential can be thought of as solving for the electrostatic potential where the current is replaced with a volume charge density : $c^2\rho \to J$.

4 Lecture 5

Relativity of motion determines that B fields change into E fields and vice-versa. Charge value is independent of reference frame but volume (change density) is not.

5 Lecture 6

Electrostatic energy can be written as

$$U_e = \int\limits_{\text{all space}} \rho \phi dV - \frac{1}{2}\epsilon_0 \int\limits_{(allspace} ||\nabla \phi||^2 dV$$