Summary For Test 6

(Celebration of:) Ampère's Law

$\int \vec{B}\cdot d\vec{l} = \mu_0 I_{encl}$ (needs sketch with Amperian Loop)

given $\vec{J}\,(\vec{J}_b, \vec{J}_f)$, $\vec{K}\,(\vec{K}_b, \vec{K}_f)$, $I\,(I_f)$

$\rightarrow \vec{B}$, $\vec{H}$

$$\vec{A}(\vec{r}) = \frac{\mu_0}{4\pi}\int \frac{\vec{J}(\vec{r}\,')\,d\tau'}{\imath} \qquad \text{etc.}$$

$$\vec{B} = \vec{\nabla}\times\vec{A} \qquad \vec{J} = \frac{1}{\mu_0}(\vec{\nabla}\times\vec{B})$$

$$\vec{m} = \int I\,d\vec{a}$$

$$\vec{B}_{dip}(\vec{r}) = \frac{\mu_0 m}{4\pi r^3}(2\cos\theta\,\hat{r} + \sin\theta\,\hat{\theta})$$

$$\& \quad \vec{B}_{dip}(\vec{r}) = \frac{\mu_0}{4\pi r^3}\left[3(\vec{m}\cdot\hat{r})\hat{r} - \vec{m}\right]$$

$$\vec{N} = \vec{m}\times\vec{B} \quad \text{and} \quad \vec{F} = \vec{\nabla}(\vec{m}\cdot\vec{B})$$

$$\vec{J}_b = \vec{\nabla}\times\vec{M} \quad \text{and} \quad \vec{K}_b = \vec{M}\times\hat{n}$$

(Ampère's Law & Interpretation)

$$\oint \vec{H}\cdot d\vec{l} = I_{f,encl} \quad \text{and} \quad \vec{B} = \mu_0(\vec{H}+\vec{M})$$

boundary conditions: derive & sketches of $\vec{M}$, $\vec{B}$, $\vec{H}$

Electrostatics & Magnetostatics