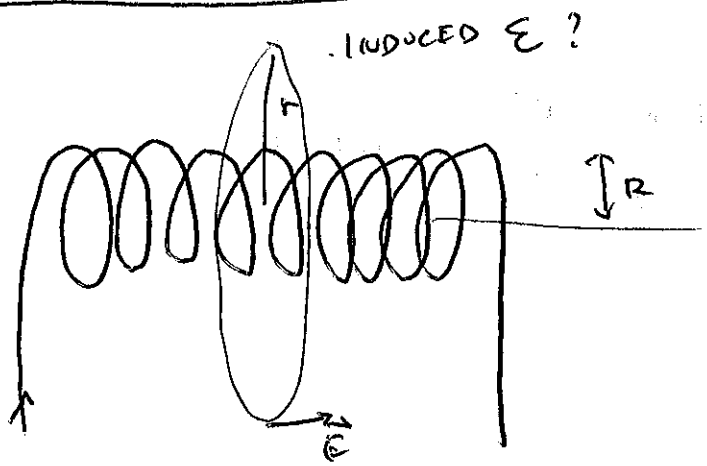
STORY

CREMATORY - INDUCTION HEATING

WORKS BY INDUCED CURRENT

POWER DELIVERED = I^2R

INDUCED EMF EXAMPLES



$I = I_{MAX} \cos(\omega t)$

$$\oint \vec{E} \cdot d\vec{s} = -\frac{d\Phi_B}{dt}$$

$$B = \mu_0 n I = \mu_0 n I_{MAX} \cos(\omega t)$$

$$\Phi_B = BA \; \mu_0 n I_{MAX} \cos(\omega t)$$

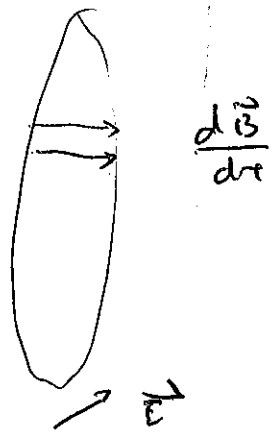
$$\frac{d\Phi_B}{dt} = -BA \; \mu_0 n I_{MAX} \omega \sin(\omega t)$$

$$\oint \vec{E} \cdot d\vec{s} = E \, 2\pi r = -\frac{d\Phi_B}{dt}$$

$$E(2\pi r) = BA \; \mu_0 n I_{MAX} \omega (\sin \omega t)$$

$$A = \pi R^2$$

$$E = \frac{\mu_0 n I_{MAX} \omega R^2}{2r} \sin(\omega t)$$



AT LARGE ω - ~~GOES~~ GROWS

b) WHAT IS IT INSIDE?

$$E = \frac{\mu_0 n I_{MAX} \omega}{2} r \sin(\omega t)$$

MAXWELL'S EQUATION

T MAXWELL 1831 ~~1831~~ - 1879

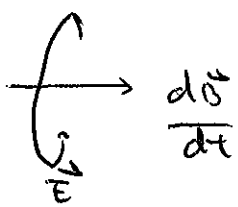
$$\vec{\nabla}\cdot\vec{E} = \frac{\rho}{\varepsilon_0}$$

$$\vec{\nabla}\cdot\vec{B} = 0$$

$$\vec{\nabla}\times\vec{E} = -\frac{d\vec{B}}{dt}$$

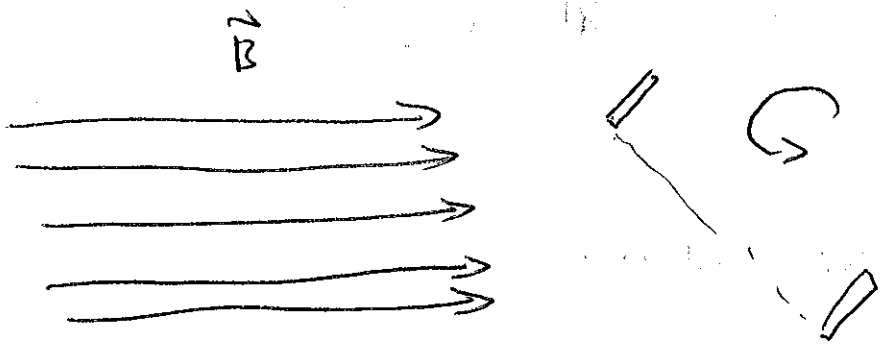
$$\vec{\nabla}\times\vec{B} = \underbrace{\mu_0\vec{J}}_{\text{AMPERE'S LAW WE KNOW}} + \mu_0\varepsilon_0\frac{\partial\vec{E}}{\partial t}$$

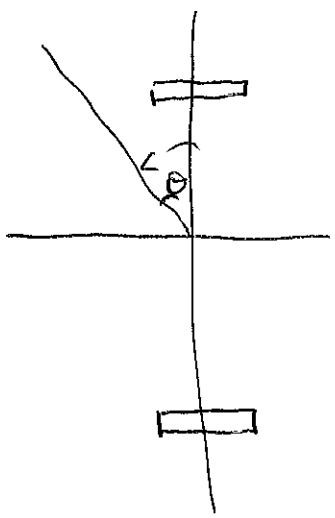
~~MAXWELL~~ DISPLACEMENT CURRENT CH.34



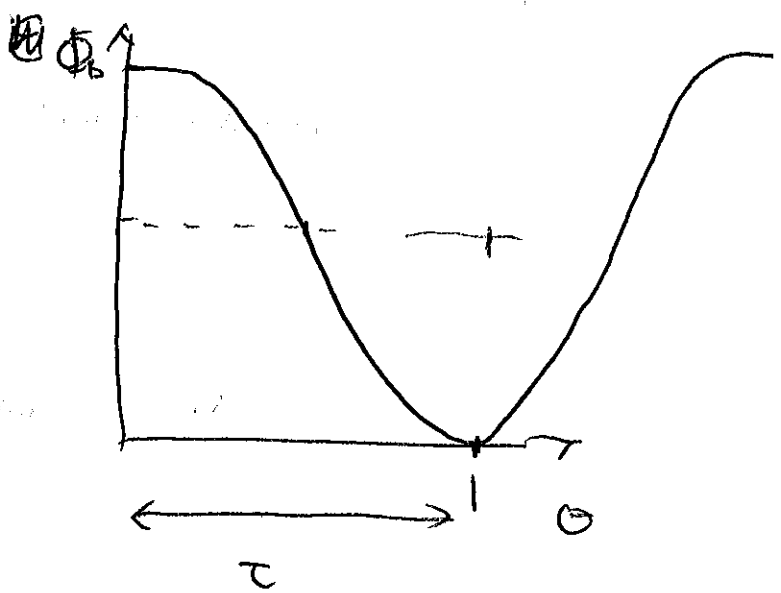
CHANGE

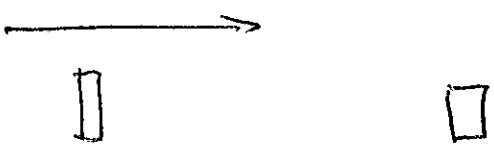
GENERATORS





$\frac{d\Phi_B}{dt}$ = NEGATIVE





$\Phi_B =$

$$\Phi_B = BA \cos(\omega t)$$

$$\boxed{\omega = \frac{2\pi}{T}}$$

$$\frac{\partial \Phi_B}{\partial t} = -BA\omega \sin(\omega t)$$

$$\mathcal{E} = BA\omega \sin(\omega t)$$

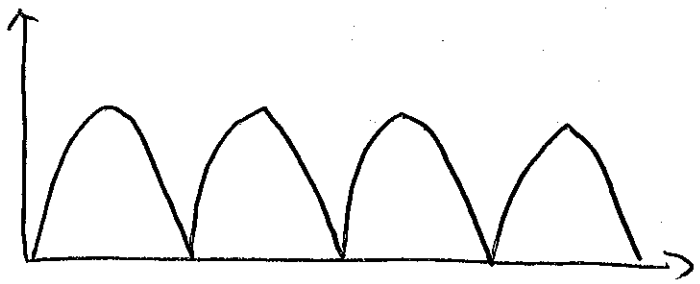
FOR LARGE COILS

$$\underline{N BA\omega \sin(\omega t)}$$

AC GENERATOR.

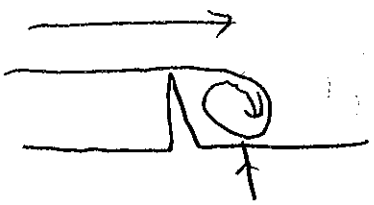
DC CURRENT GENERATOR

BRUSHED TO ALLOW ONLY + SIGNS



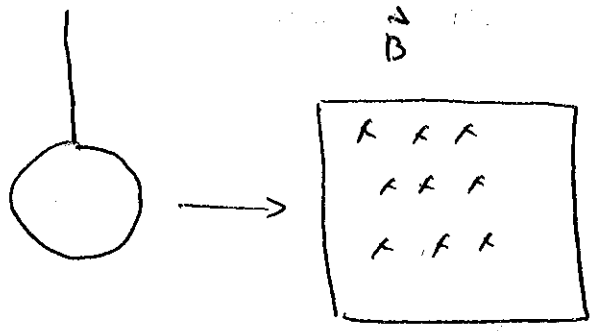
EDDY CURRENTS

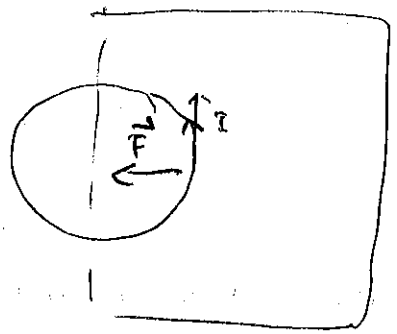
CIRCULATING CURRENT ~~USE~~ INDUCED BY $\vec{B}$

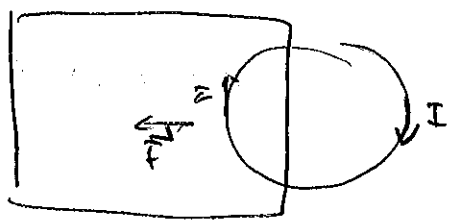


KIND OF SIMILAR.

EDDY


$\vec{B}$


$\vec{F}$
I


$\vec{F}$
I