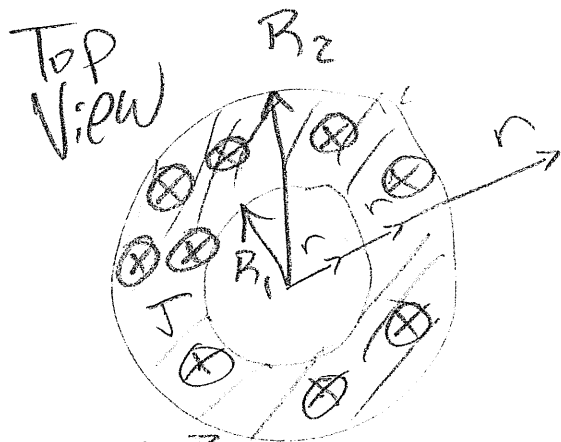


Ampere's Law:

Solid cylindrical shell inner radius R_1 , outer radius R_2 filled with current density J into the page. Sketch and find $B(r)$

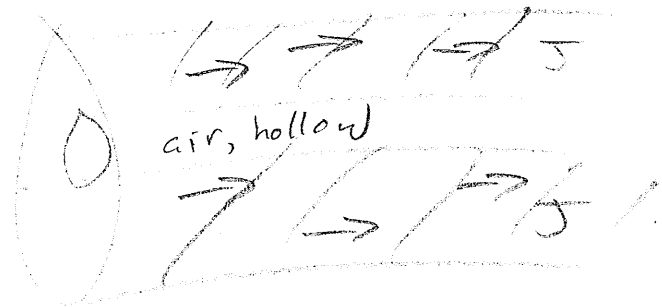
3 regions: $r < R_1$, $R_1 \leq r < R_2$ and $R_2 \leq r$



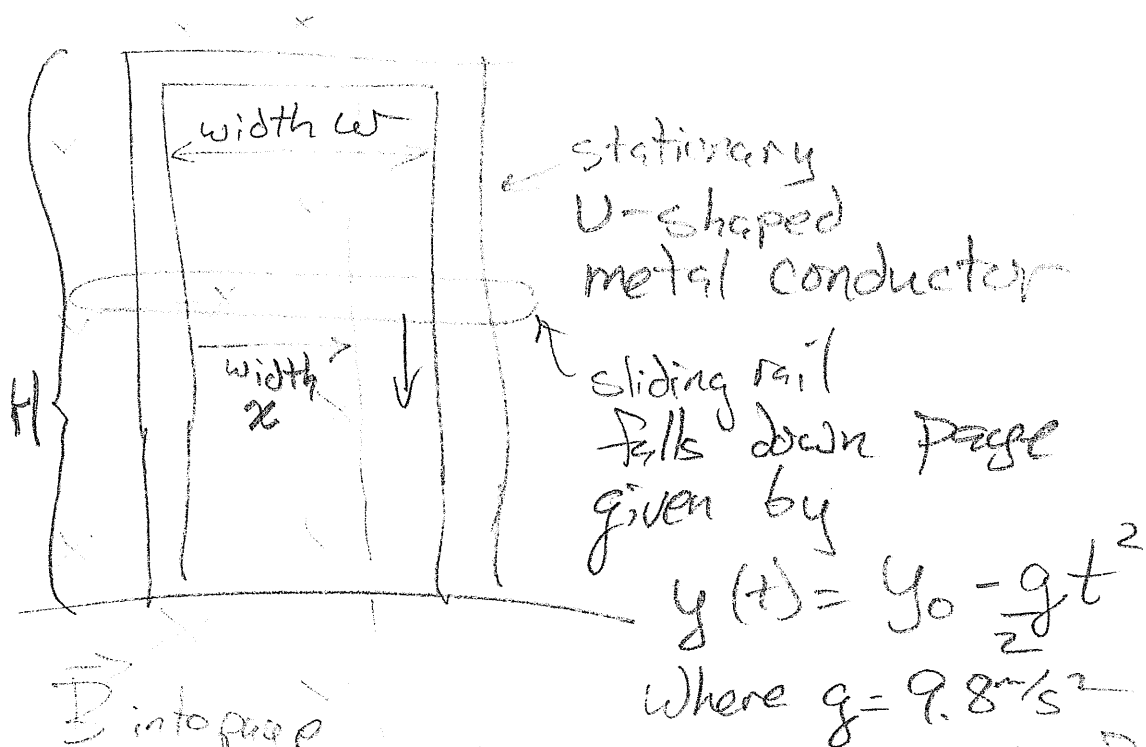
$$\oint \vec{B} \cdot d\vec{\ell} = \mu_0 I_{in}$$

$$J = \frac{I}{\text{area}}$$

side view



Faraday's Law



$$\vec{B} \text{ into page} \\ = B_1$$

Use Faraday's Law to find $V(t)$ in loop bounded by U-shaped rail and movable rod as a function of time.

$$V = - \frac{d}{dt} \int \vec{B} \cdot d\vec{a}$$