Lecture 43 outline: 12/04/2020

- Final homework due this afternoon.
- Skip SPN 10-13
- Problem SPN 10-10
- Final Exam
- Exam 2
- Boundary conditions at a current plane.

SPN 10-10a

A magnetic field in a radius “a” goes to zero as
$\vec{B} = 0.2(1 - 10\,t)\,T\,\hat{z}$.
What is the electric field at radius b?

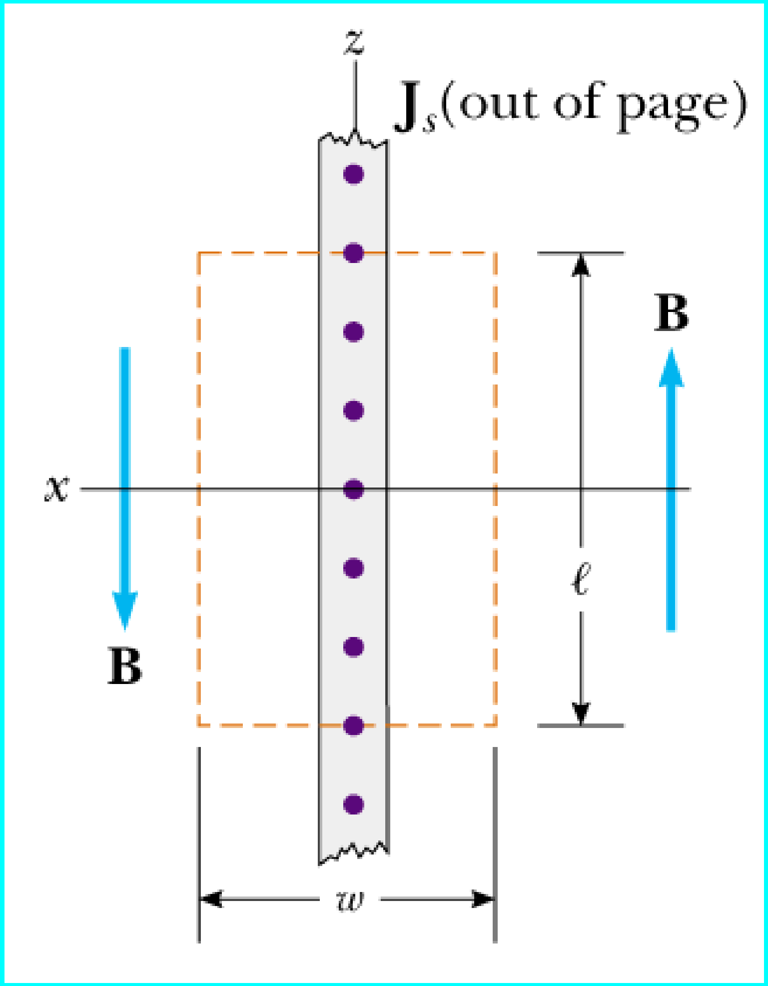
SPN 10-10b

A charged insulating hoop of radius b lies outside a magnetic field in a radius "a" $\vec{B}=0.2(1-10\,t)\,T\,\hat{z}$.
The hoop has charge Q and mass m.
What happens to the hoop?

Final Exam

Exam 2

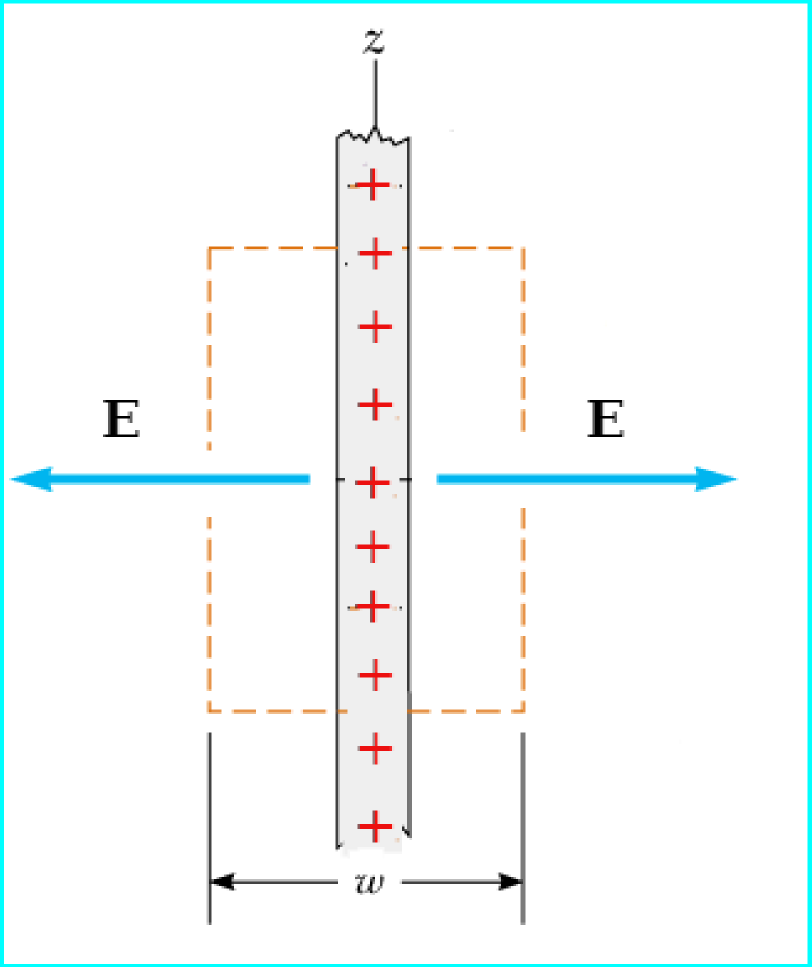
Infinite Current Sheet



$$\Delta B_{\parallel} = \mu_0 J t$$

$$\Delta B_{\parallel} = \mu_0 K$$

Infinite Charge Sheet



$$\Delta E_n = \frac{\sigma}{\epsilon_0}$$

Ampere's Law

(with displacement current)

$$\oint \vec{B}\cdot d\vec{l} = \mu_0 \epsilon_0 \frac{\partial}{\partial t}\Phi_E$$

$$\oint \vec{B}\cdot d\vec{l} = \mu_0 \epsilon_0 \frac{\partial}{\partial t}\int \vec{E}\cdot d\vec{a}$$

$$\int \nabla\times\vec{B}\cdot d\vec{a} = \mu_0 \epsilon_0 \frac{\partial}{\partial t}\int \vec{E}\cdot d\vec{a}$$

$$\nabla\times\vec{B} = \mu_0 \epsilon_0 \frac{\partial \vec{E}}{\partial t}$$

Faraday's Law

$$\oint \vec{E}\cdot d\vec{l} = -\frac{\partial}{\partial t}\Phi_B$$

$$\oint \vec{E}\cdot d\vec{l} = -\frac{\partial}{\partial t}\int \vec{B}\cdot d\vec{a}$$

$$\int \nabla\times\vec{E}\cdot d\vec{a} = -\frac{\partial}{\partial t}\int \vec{B}\cdot d\vec{a}$$

$$\nabla\times\vec{E} = -\frac{\partial \vec{B}}{\partial t}$$