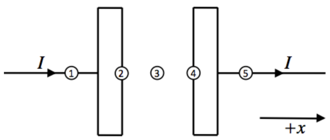
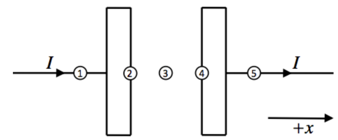


Let's return to the complete definition of Ampere's Law:
$\nabla \times \mathbf{B} = \mu_0 \mathbf{J} + \varepsilon_0 \mu_0 \frac{d\mathbf{E}}{dt}$.

At location 1, what are the signs of $J_x, dE_x/dt$, and $(\nabla \times \mathbf{B})_x$?

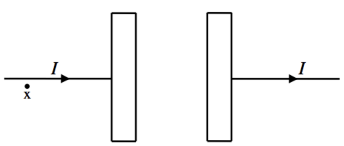
A. $J_x < 0, dE_x/dt < 0, (\nabla \times \mathbf{B})_x < 0$
B. $J_x = 0, dE_x/dt > 0, (\nabla \times \mathbf{B})_x > 0$
C. $J_x > 0, dE_x/dt = 0, (\nabla \times \mathbf{B})_x > 0$
D. $J_x > 0, dE_x/dt > 0, (\nabla \times \mathbf{B})_x > 0$
E. Something else



Let's return to the complete definition of Ampere's Law:
$\nabla \times \mathbf{B} = \mu_0 \mathbf{J} + \varepsilon_0 \mu_0 \frac{d\mathbf{E}}{dt}$.

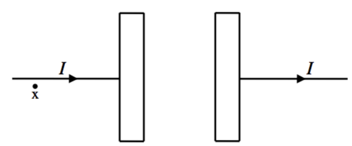
At location 3, what are the signs of $J_x, dE_x/dt$, and $(\nabla \times \mathbf{B})_x$?

A. $J_x < 0, dE_x/dt < 0, (\nabla \times \mathbf{B})_x < 0$
B. $J_x = 0, dE_x/dt > 0, (\nabla \times \mathbf{B})_x > 0$
C. $J_x > 0, dE_x/dt = 0, (\nabla \times \mathbf{B})_x > 0$
D. $J_x > 0, dE_x/dt > 0, (\nabla \times \mathbf{B})_x > 0$
E. Something else



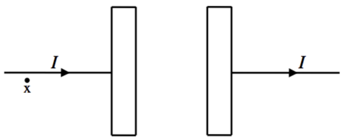
A pair of capacitor plates are charging up due to a current I. The plates have an area $A = \pi R^2$. Use the Maxwell-Ampere Law to find the magnetic field at the point "x" in the diagram as distance r from the wire.

A. $B = \frac{\mu_0 I}{4\pi r}$
B. $B = \frac{\mu_0 I}{2\pi r}$
C. $B = \frac{\mu_0 I}{4\pi r^2}$
D. $B = \frac{\mu_0 I}{2\pi r^2}$
E. Something much more complicated



The plates have an area $A = \pi R^2$. Use the Gauss' Law to find the electric field between the plates, answer in terms of σ the charge density on the plates.

A. $E = \sigma/\varepsilon_0$
B. $E = -\sigma/\varepsilon_0$
C. $E = \sigma/(\varepsilon_0 \pi R^2)$
D. $E = \sigma \pi R^2/\varepsilon_0$
E. Something much more complicated

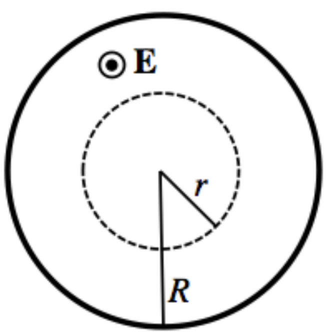


The plates have an area $A = \pi R^2$. Determine the relationship between the current flowing in the wires and the rate of change of the charge density on the plates.

A. $d\sigma/dt = I$
B. $\pi R^2 d\sigma/dt = I$
C. $d\sigma/dt = \pi R^2 I$
D. Something else

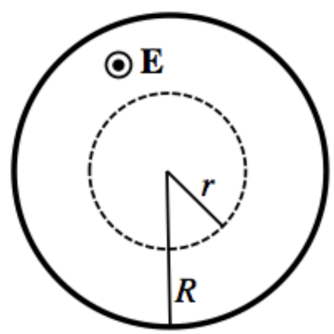
We found the relationship between the current and the change of the charge density was: $\pi R^2 d\sigma/dt = I$. Determine the rate of change of the electric field between the plates, $d\mathbf{E}/dt$.

A. $\sigma/\varepsilon_0 \hat{x}$
B. $I/(\pi R^2 \varepsilon_0)\hat{x}$
C. $-I/(\pi R^2 \varepsilon_0)\hat{x}$
D. $I/(2\pi R \varepsilon_0)\hat{x}$
E. $-I/(2\pi R \varepsilon_0)\hat{x}$



Use the Maxwell-Ampere Law to derive a formula for the manetic at a distance $r < R$ from the center of the plate in terms of the current, I.

A. $B = \frac{\mu_0 I}{2\pi r}$
B. $B = \frac{\mu_0 I r}{2\pi R^2}$
C. $B = \frac{\mu_0 I}{4\pi r}$
D. $B = \frac{\mu_0 I r}{4\pi R^2}$
E. Something else entirely



Use the Maxwell-Ampere Law to derive a formula for the manetic at a distance $r > R$ from the center of the plate in terms of the current, I.

A. $B = \frac{\mu_0 I}{2\pi r}$
B. $B = \frac{\mu_0 I r}{2\pi R^2}$
C. 0
D. Something else entirely