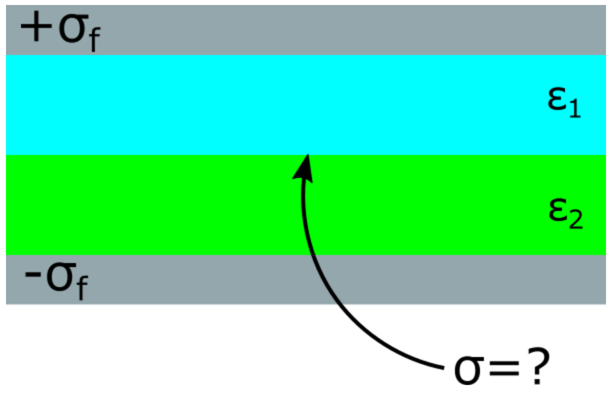
A negative charge ($-q$) is moving in the $+x$ direction when it encounters a region of constant magnetic field pointing in the $-y$ direction. Which is the direction of the initial net force on the charge?

A. $+y$
B. $-y$
C. $+z$
D. $-z$
E. ???

In the boundary condition for $E_\perp$, the difference across the boundary is $\dfrac{\sigma}{\varepsilon_0}$. What does that σ contain?

A. Just σ_f
B. Just σ_b
C. Both
D. Something else

Let's assume the normal vector at the material boundary points upward.

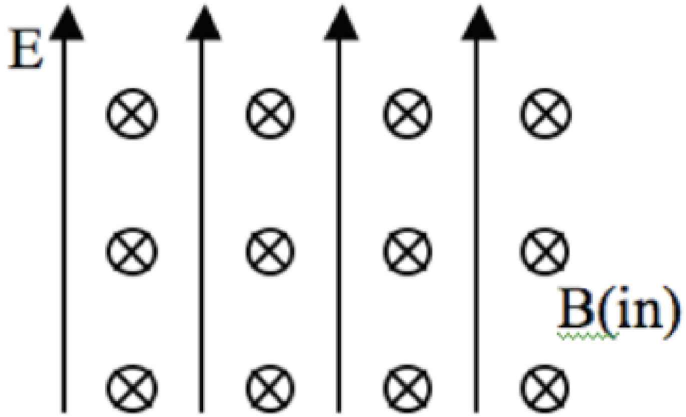


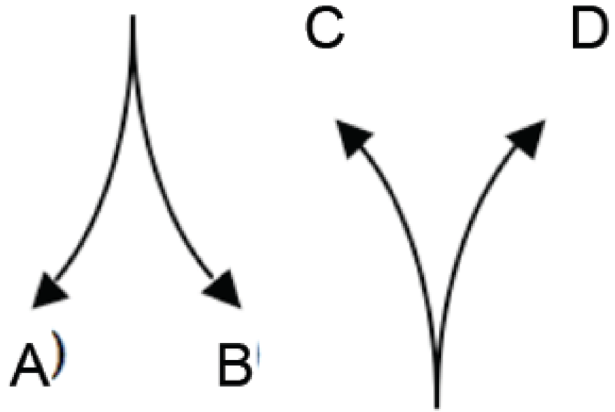
What the sign of the dot product of the electric field and this normal vector above and below the boundary (i.e., $\mathbf{E} \cdot \mathbf{n}$)?

A. Above is positive; below is negative
B. Above is negative; below is negative
C. Above is negative; below is positive
D. Above is positive; below is positive

MAGNETOSTATICS

A proton ($q = +e$) is released from rest in a uniform $\mathbf{E}$ and uniform $\mathbf{B}$. $\mathbf{E}$ points up, $\mathbf{B}$ points into the page. Which of the paths will the proton initially follow?

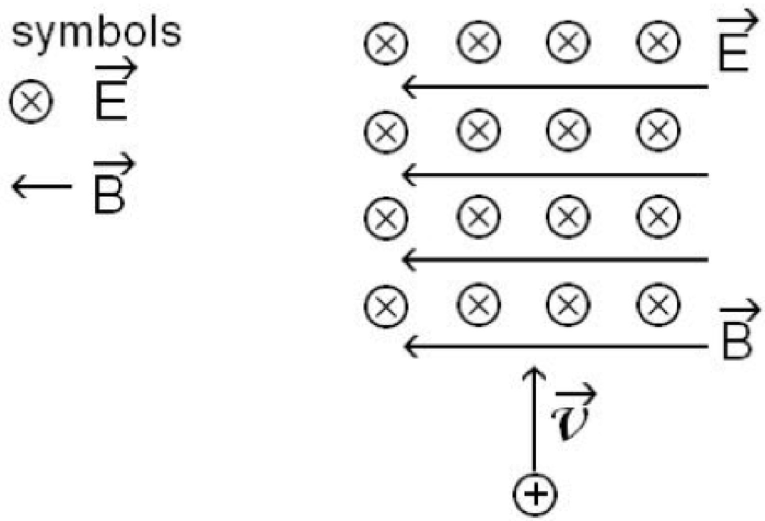




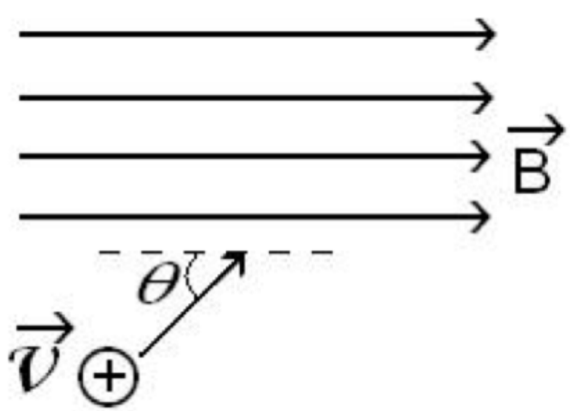
E. It will remain stationary

A + charged particle moving up (speed v) enters a region with uniform $\mathbf{B}$ (left) and uniform $\mathbf{E}$ (into page). What's the direction of $\mathbf{F}_{net}$ on the particle, at the instant it enters the region?

A. To the left
B. Into the page
C. Out of the page
D. No net force
E. Not enough information



A proton (speed v) enters a region of uniform $\mathbf{B}$. v makes an angle θ with $\mathbf{B}$. What is the subsequent path of the proton?



A. Helical
B. Straight line
C. Circular motion, $\perp$ to page. (plane of circle is $\perp$ to $\mathbf{B}$)
D. Circular motion, $\perp$ to page. (plane of circle at angle θ w.r.t. $\mathbf{B}$)
E. Impossible. $\mathbf{v}$ should always be $\perp$ to $\mathbf{B}$