Lecture 4 — Concept Test 1

A magnetic field points straight up towards the ceiling. What is the direction of the magnetic force (or is $F_{\text{mag}} = 0$?) for ...

1. $\uparrow$	**3.** $\rightarrow$	**5.** toward front of room	**back of card** $F = 0$
2. $\downarrow$	**4.** $\leftarrow$	**6.** toward back of room	

(a) an electron sitting motionless on your desk?

(b) a proton moving towards the front of the room (towards the chalkboard)?

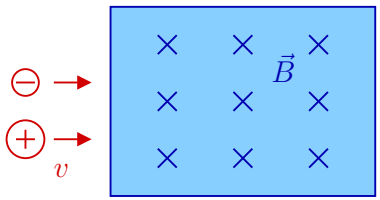
(c) an electron moving towards the front of the room?

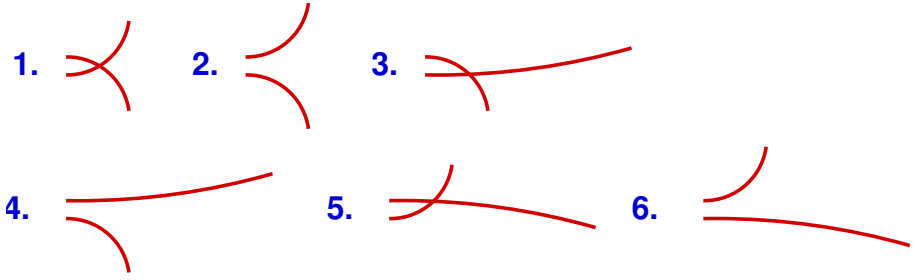
(d) proton moving straight up towards the ceiling?

(e) an electron moving to the right (from your perspective)?

Lecture 4 — Concept Test 2

An electron and a proton enter a region of uniform magnetic field pointing into the screen, both traveling with the same initial speed. Which of the following sketches best shows the paths of the two particles? (Neglect electrical attraction between the two particles.)

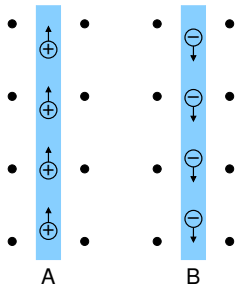




Lecture 4 — Concept Test 3

Two conductors are located in a uniform magnetic field pointing out of the page. In conductor A, positive charges move upward, while in conductor B negative charges move downward.

What is the direction of the force on the two conductors?

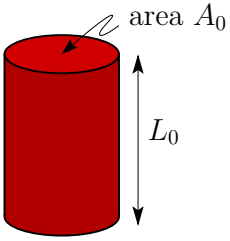


1. Left for A, right for B
2. Left for A, left for B
3. Right for A, right for B
4. Right for A, left for B
5. Into page for A, out for B
6. The force is zero for both

Lecture 4 — Concept Test 4

Assume that a nichrome wire with length L_0 and cross-sectional area A_0 has a resistance R_0. Stretch it out, increasing its length to $2L_0$ and cutting its cross-sectional area to $A_0/2$ (this keeps the total amount of nichrome constant).

What is the resistance of the stretched wire?



1. 0
2. $R_0/4$
3. $R_0/2$
4. R_0
5. $2R_0$
6. $4R_0$