B10 · Extra practice

Fields around currents | Diploma-style set of 8

Constants from the Alberta Physics 30 data sheets: $k = 8.99 \times 10^{9}$ N·m²/C², $e = 1.60 \times 10^{-19}$ C, electron mass $m_e = 9.11 \times 10^{-31}$ kg, proton mass $m_p = 1.67 \times 10^{-27}$ kg, $g = 9.81$ m/s².

Easy · B10-X01. A straight wire carries a conventional current out of the page, toward you. At a point to the right of the wire, which way does the magnetic field point?

A. Down the page
B. Up the page
C. Into the page
D. To the right

Response: _____

Easy · B10-X02. Electrons flow east along a wire. What is the direction of the conventional current?

A. West
B. East
C. North
D. There is no conventional current.

Response: _____

Medium · B10-X03. Looking at the right end of a solenoid, the conventional current goes around its coils counterclockwise. Which end of the solenoid is its north pole?

A. The left end, the far end
B. Both ends are north poles.
C. The north pole is in the middle of the solenoid.
D. The right end, the end nearest the viewer

Response: _____

Medium · B10-X04. Which change makes the magnetic field inside a solenoid stronger?

A. Use fewer turns and remove the current
B. Reverse the current only
C. Add more turns per length and put an iron core inside
D. Use a longer wire with the same number of turns per length

Response: _____

Challenging · B10-X05. A long horizontal wire lies across the page with conventional current to the right. At a point just below the wire, which way does the magnetic field point?

A. Out of the page
B. Into the page
C. To the right
D. Up the page

Response: _____

Medium · B10-X06. Describe the shape and direction of the magnetic field inside a long solenoid, and compare it with the field outside.

Response: _____

Medium · B10-X07. Give two ways to make the field of a straight current-carrying wire stronger at a point near it, and one way to reverse the field.

Response: _____

Challenging · B10-X08. A compass is placed below a horizontal wire and the needle points north when there is no current. When a current flows, the needle turns. When the current is reversed, the needle turns the other way. Explain both observations.

Response: _____