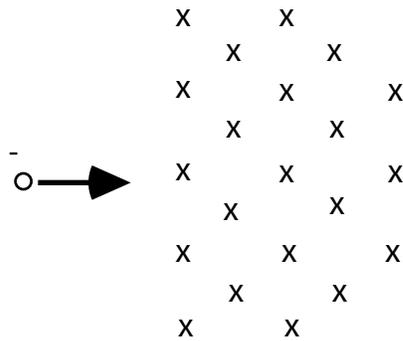


Magnetic Forces and Fields : Quiz-30

1) An electron enters the magnetic field (directed into page) as shown. The field is directed into the page. Give the initial direction of the force on the electron.



2) A current I flows in a solenoid. The field produced at the center of the solenoid is B . Explain what happens to the field, if the number of loops is doubled and the current is doubled.

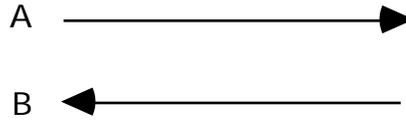
3) A 0.20 m wire is oriented perpendicular to a magnetic field. The current in the wire is 3.5 A. It experiences a force of 1.2 N. Find the magnitude of the magnetic field.

4) A proton has a velocity of 8.0×10^5 m/s. It enters a 0.023 T magnetic field at right angles. Find the magnitude of the force which acts on the proton.

5) The wire below carries a current of 850 mA. Find the magnitude and direction of the magnetic field at the point x which is 0.42 m away from the wire.



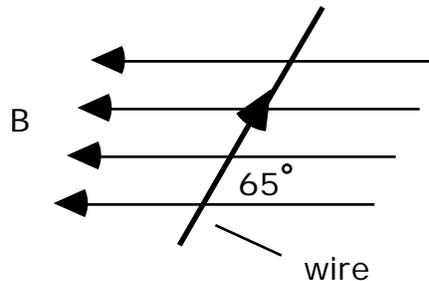
6) Two parallel wires which are 4.2 cm apart, carry currents of 0.60 A and 1.5 A respectively as shown below. The currents flow in opposite directions. The wires are 35 cm long. Find the force on wire A. Give the direction.



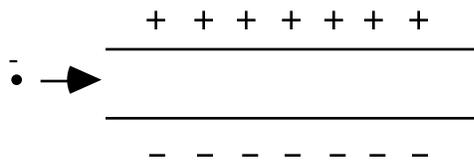
7) A charge q , of mass m , with a velocity v , enters a perpendicular magnetic field B and starts to move in a circle.

- Find the radius r of the circle.
- Give an expression for the momentum, in terms of B , q , v , m , and r . (all of these terms may not be needed)

8) Find the force and direction on the wire below. The field is 0.0084 T. The current is 0.33 A and the length of the wire in the field is 2.6 cm. The angle between the field and the wire is 65° .



9) A velocity selector is shown below. The charge on the ion is -3.2×10^{-19} C. The electric field is 4.9×10^5 V/m [down]. When the magnetic field is on, the negatively charged ion moves in a straight line through the plates with a velocity of 1.0×10^5 m/s.



a) Give the direction of the magnetic field.

b) Find the magnitude of the magnetic field.

Answers: 1) [down], 2) B is multiplied by 4, 3) 1.7 T, 4) 2.9×10^{-15} N, 5) 4.0×10^{-7} T [into page], 6) 1.5×10^{-6} N [up], 7) a) $r = (mv)/(qB)$, b) $p = qrB$, 8) 6.5×10^{-5} N [out of page], 9) a) [into page], b) use $qE = qvB$, $B = 4.9$ T.