1. The north pole of a magnet points toward the earth's

**south pole – magnetic which corresponds to the geometric north**

1. 1 T is equivalent to

**N/A˙m**

1. The SI unit of magnetic field is the

**tesla**

1. A vertical wire carries a current straight up in a region where the magnetic field vector points due north. What is the direction of the resulting force on this current?

**West**

1. A wire carries a current of 10 A in a direction of 30º with respect to the direction of a 0.30-T magnetic field. Find the magnitude of the magnetic force on a 0.50 m length of the wire.

**0.75 N**

1. A 2.0-m wire carrying a current of 0.60 A is oriented **parallel** to a uniform magnetic field of 0.50 T. What is the magnitude of the force it experiences?

**zero**

1. A wire carries a current of 10 A in a direction of 30º with respect to the direction of a 0.30-T magnetic field. Find the magnitude of the magnetic force on a 0.50 m length of the wire.

**0.75 N**

1. What is the force per meter on a straight wire carrying 5.0 A when it is placed in a magnetic field of 0.020 T? The wire makes an angle of 27º with respect to the magnetic field lines.

**0.045 N**

1. The direction of the force on a current-carrying wire in a magnetic field is described by which of the following?

perpendicular to the current and perpendicular to the magnetic field

1. A thin copper rod 1.0 m long has a mass of 0.050 kg and is in a magnetic field of 0.10 T. What minimum current in the rod is needed in order for the magnetic force to cancel the weight of the rod?

**4.9 A**

1. A **stationary** proton is in a uniform magnetic field of 0.20 T. What is the magnitude of the magnetic force on the proton?

**zero**

1. A proton moving at 5.0X104 m/s horizontally enters a region where a magnetic field of 0.12 T is present, directed vertically downward. What force acts on the proton?

**9.6X10-16 N**

1. At a particular instant, an electron moves eastward at speed V in a uniform magnetic field that is directed straight downward. The magnetic force that acts on it is

x x x B

x x x

**directed to the south.** x x x

FB

At a particular instant, a proton moves eastward at speed V in a uniform magnetic field that is directed straight downward. The magnetic force that acts on it is

**directed north**

1. A charged particle is injected into a uniform magnetic field such that its velocity vector is perpendicular to the magnetic field vector. Ignoring the particle's weight, the particle will

**follow a circular path.**

1. A proton travels at a speed of 5.0X107 m/s through a 1.0 T magnetic field. What is the magnitude of the magnetic force which acts on the proton if the angle between the proton's velocity and the magnetic field vector is 30¯?

**d) 4.0X10-12 N**

1. An **electron** has an initial velocity to the south but is observed to curve upward as the result of a magnetic field. The direction of the magnetic field is

**a) to the west.**

1. A charged particle moves across a constant magnetic field. The magnetic force on this particle

**causes the particle to accelerate. (Causes centripetal acceleration)**

.

1. A charged particle moves and experiences no magnetic force. From this we can conclude that

**either no magnetic field exists or the particle is moving parallel to the field.**

1. An electron traveling due north with speed 4.0X105 m/s enters a region where the earth's magnetic field has the magnitude 5.0X10-5 T and is directed downward at 45¯ below horizontal. What force acts on the electron?

**2.3X10-18 N**

1. An electron moves with a speed of 8.0X106 m/s along the +x axis. It enters a region where there is a magnetic field of 2.5 T, directed at an angle of 60¯ to the +x axis and lying in the xy plane. Calculate the acceleration of the electron.

**3.1X1018 m/s2**

1. A proton has a speed of 3.0X106 m/s in a direction perpendicular to a uniform magnetic field, and the proton moves in a circle of radius 0.20 m. What is the magnitude of the magnetic field?

**0.16 T**

1. An electron moves with a speed of 3.0X104 m/s perpendicular to a uniform magnetic field of 0.40 T. What is the magnitude of the magnetic force on the electron?

**1.9X10-15 N**

1. An electron moving along the +x axis enters a region where there is a uniform magnetic field in the +y direction. What is the direction of the magnetic force on the electron? (+x to right, +y up, and +z out of the page.)

**+z direction FB + Z**

**. . .**

e velocity **+X**

**. . +Y . B**

1. Which of the following is correct?

a) When a current carrying wire is in your right hand, thumb in the direction of the magnetic field lines, your fingers point in the direction of the current.

b) When a current carrying wire is in your left hand, thumb in the direction of the magnetic field lines, your fingers point in the direction of the current.

c) When a current carrying wire is in your right hand, thumb in direction of the current, your fingers point in the direction of the magnetic field lines.

d) When a current carrying wire is in your left hand, thumb pointing in the direction of the current, your fingers point in the direction of the magnetic field lines.

Magnetism II Questions

1. How much current must flow for 1.0X10-3 T of magnetic field to be present 1.0 cm from a wire?

**50 A**

1. A high power line carrying 1000 A generates what magnetic field at the ground, 10 m away?

**2.0X10-5 T**

1. A long straight wire carries current toward the east. A proton moves toward the east alongside and just south of the wire. What is the direction of the force on the proton?
   1. **up x x x**

x x x

1. At what distance from a long straight wire carrying a current of 5.0 A is the magnitude of the magnetic field due to the wire equal to the strength of the earth's magnetic field of about 5.0X10-5 T?

**2.0 cm**

1. Two long parallel wires carry currents of 10 A in opposite directions. They are separated by 40 cm. What is the magnetic field in the plane of the wires at a point that is 20 cm from one wire and 60 cm from the other?

**6.7X10-6 T**

1. Two long parallel wires placed side-by-side on a horizontal table carry identical size currents in opposite directions. The wire on your right carries current toward you, and the wire on your left carries current away from you. From your point of view, the magnetic field at the point exactly midway between the two wires

left current **x** right current

**points down.**

B

1. Two long parallel wires placed side-by-side on a horizontal table carry identical current straight toward you. From your point of view, the magnetic field at the point exactly between the two wires

**is zero.**

1. At double the distance from a long current-carrying wire, the strength of the magnetic field produced by that wire decreases to

**1/2 of its original value.**

1. A horizontal wire carries a current straight toward you. From your point of view, the magnetic field caused by this current

**circles the wire in a counter-clockwise direction.**

1. A vertical wire carries a current straight down. To the east of this wire, the magnetic field points

**south. x**

1. A vertical wire carries a current straight down. To the east of this wire, the magnetic field points

**south**

1. Two long parallel wires are placed side-by-side on a horizontal table. If the wires carry current in the same direction,

**the wires attract each other**

1. Two long parallel wires carry currents of 5.0 A and 8.0 A in the same direction. The wires are separated by 0.30 m. Find the magnetic force per unit length between the two wires.

**2.7X10-5 N attractive F=o I1I2**

**l 2d**

1. Two long parallel wires carry equal currents. The magnitude of the force between the wires is F. The current in each wire is now doubled. What is the magnitude of the new force bewteen the two wires?

**4F**

1. What is the magnetic field at the center of a circular loop of wire of radius 4.0 cm when a current of 2.0 A flows in the wire?

**3.1X10-5 T**

1. A current carrying loop of wire lies flat on a table top. When viewed from above, the current moves around the loop in a counterclockwise sense. What is the direction of the magnetic field caused by this current, outside the loop? The magnetic field

**points straight down.**

1. Consider two current-carrying circular loops. Both are made from one strand of wire and both carry the same current, but one has twice the radius of the other. Compared to the magnetic field at the center of the smaller loop, the magnetic field at the center of the larger loop is

**less**

1. A charged particle is observed traveling in a circular path in a uniform magnetic field. If the particle had been traveling twice as fast, the radius of the circular path would be

**twice the original radius. qvB=mv2 r= mv**

**r qB**

1. A particle carrying a charge of +e travels in a circular path in a uniform magnetic field. If instead the particle carried a charge of +2e, the radius of the circular path would have been

**qvB=mv2 r= mv**

**r qB**

**one-half the original radius.**

1. In a mass spectrometer, a single-charged particle (charge e) has a speed of 1.0X106 m/s and enters a uniform magnetic field of 0.20 T. The radius of the circular orbit is 0.020 m. What is the mass of the particle?

**qvB=mv2 q B r = m**

**6.4X10-28 kg**  **r v**

1. A doubly charged ion with velocity 6.9X106 m/s moves in a path of radius 30 cm in a magnetic field of 0.80 T in a mass spectrometer. What is the mass of this ion?

**13X10-27 kg**

**qvB=mv2 q B r = m**

**r v**