AP Physics 2
Quiz: Magnetism, Form: A

Name: _____
Date: _____
Period: _____
Peer Reviewer: _____
Authentication Code: _____

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Section 1. True or False

_____ All metals are attracted to a magnet.

_____ Magnetic fields are created by moving charges.

_____ All permanent magnets are made of iron.

_____ Charged particles that are moving in a magnetic field can move along a circular, helical, or linear path, depending on their orientation to the magnetic field.

_____ Larger magnets are always stronger than smaller magnets.

_____ If a permanent magnet is heated enough, it will eventually lose its magnetism.

_____ The magnetic and geographic poles of the earth are located at the same place.

_____ A magnetic field is infinite in size.

_____ Only permanent magnets produce magnetic fields.

_____ A changing magnetic field will cause current to flow in a nearby loop of wire.

_____ Magnetic fields can be canceled by electrostatic fields.

_____ Magnetic forces can be canceled by electrostatic forces.

_____ The Earth's north magnetic pole is located near the Earth's geographic north pole.

_____ Two parallel wires that carry current in the same direction will be attracted to each other.

_____ Magnets repel non-metals.

_____ Like poles repel and unlike poles attract.

_____ The magnitude of a cross product can be calculated by multiplying the magnitude of the two vectors and then multiplying by the sin of the angle between them.

_____ If the earth had no magnetic field, there would be no auroras.

_____ If the earth had no magnetic field, humans would not be able to generate electricity.

_____ A electron is at rest in a magnetic field directed to the right. It will accelerate to the left.

_____ A dot product is a way to multiply two vectors and get a scalar.

Section 2. Multiple Choice

1. A magnetic field is directed into the page, but it is not known how or whether the magnetic field is changing. A counterclockwise current is induced in a loop of wire that is oriented in the plane of the page. How is the magnetic field changing?

   (a) The magnetic field is getting stronger.

   (b) The magnetic field is getting weaker.

   (c) The magnetic field is remaining constant.

   (d) There is not enough information to determine how the field is changing.

2. Two long, parallel wires are oriented horizontally. Both wires carry the same amount of current in the +x direction. What is the magnetic force that the wires exert on each other?

   (a) The magnetic force is attractive.

   (b) The magnetic force is repulsive.

   (c) The magnetic force causes the wires to rotate.

   (d) There is no magnetic force in this situation.

3. An electron travels toward the top of the page through a magnetic field that is directed out of the page. The magnetic force on the electron is directed -

   (a) to the left.

   (b) to the right.

   (c) toward the top of the page.

   (d) toward the bottom of the page.

   (e) into the page.

   (f) out of the page.

4. On September 1, 1859, an extremely powerful solar flare struck the earth, known as the Carrington Event. This event disrupted the Earth's magnetic field enough to cause powerful Aurora all over the planet. Many telegraph operators were shocked, and reported papers on their desks catching fire. Which of the following equations would be most useful in determining why the telegraphs malfunctioned?

   (a) $\varepsilon = -\frac{\Delta \Phi_B}{\Delta t}$

   (b) $\vec{F}_B = q\vec{v} \times \vec{B}$

   (c) $\vec{F}_B = I\vec{\ell} \times \vec{B}$

   (d) $B = \frac{\mu_0}{2\pi} \frac{I}{r}$

5. A 2-Tesla magnetic field is directed to the left. A particle has a charge of 0.03 C, and is moving to the right as a speed of 4 m/s. What is the force that is felt by the particle?

   (a) .64 N

   (b) 0.36 N

   (c) 0.24 N

   (d) 0 N

Answer Key for Exam A

Section 1. True or False

False All metals are attracted to a magnet.

True Magnetic fields are created by moving charges.

False All permanent magnets are made of iron.

True Charged particles that are moving in a magnetic field can move along a circular, helical, or linear path, depending on their orientation to the magnetic field.

False Larger magnets are always stronger than smaller magnets.

True If a permanent magnet is heated enough, it will eventually lose its magnetism.

False The magnetic and geographic poles of the earth are located at the same place.

True A magnetic field is infinite in size.

False Only permanent magnets produce magnetic fields.

True A changing magnetic field will cause current to flow in a nearby loop of wire.

False Magnetic fields can be canceled by electrostatic fields.

True Magnetic forces can be canceled by electrostatic forces.

False The Earth's north magnetic pole is located near the Earth's geographic north pole.

True Two parallel wires that carry current in the same direction will be attracted to each other.

False Magnets repel non-metals.

True Like poles repel and unlike poles attract.

True The magnitude of a cross product can be calculated by multiplying the magnitude of the two vectors and then multiplying by the sin of the angle between them.

True If the earth had no magnetic field, there would be no auroras.

False If the earth had no magnetic field, humans would not be able to generate electricity.

False A electron is at rest in a magnetic field directed to the right. It will accelerate to the left.

True A dot product is a way to multiply two vectors and get a scalar.

Section 2. Multiple Choice

1. A magnetic field is directed into the page, but it is not known how or whether the magnetic field is changing. A counterclockwise current is induced in a loop of wire that is oriented in the plane of the page. How is the magnetic field changing?

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