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Halliday/Resnick/Walker
Fundamentals of Physics 8th edition

Classroom Response System Questions

Chapter 28 Magnetic Fields

Reading Quiz Questions

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28.2.1. Which one of the following choices is not a possible way to produce a magnetic field?

a) Set up a current in a long, straight wire.

b) Uniformly distribute charges over the surface of a conductor.

c) Make an object out of materials that have an intrinsic magnetic field.

d) Pass a current through a coil of wire.

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28.3.1. Consider the following quantities: (1) mass, (2) velocity, (3) charge, and (4) magnetic field strength. Upon which of these quantities is the force on a charged particle moving in a magnetic field dependent?

a) 1 and 4 only

b) 2 and 3 only

c) 1, 3, and 4 only

d) 2, 3, and 4 only

e) 1, 2, and 3 only

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28.3.2. A charged particle is moving in a magnetic field. What is the direction of the force on the particle due to the magnetic field?

a) in the direction of the magnetic field

b) in the direction opposite to which the particle is moving

c) in the direction that is perpendicular to both the magnetic field and the velocity

d) in the same plane as the magnetic field and the velocity, but not in either of those two directions

e) in the direction of motion

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28.3.3. Which of the following combinations of units is equivalent to the tesla?

a) N/(A·m)

b) N·A/m

c) (J·s)/(A·m)

d) J/(C·s)

e) C/(J·s)

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28.3.4. Complete the following sentence: When a positively-charged particle is released from rest in a region that has a magnetic field directed due east, the particle will

a) remain at rest.

b) be accelerated due east.

c) be accelerated due north.

d) be accelerated upward.

e) be accelerated downward.

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28.3.5. Which one of the following conditions is not a requirement for a particle to experience a magnetic force when placed in a magnetic field?

a) The particle must be moving.

b) The particle must be charged.

c) The particle must not be under the influence of any other forces.

d) The velocity of the particle must have a component that is perpendicular to the direction of the magnetic field.

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38.3.6. Which one of the following is the SI unit for the magnetic field?

a) monopole (MP)

b) tesla (T)

c) fermi (Fm)

d) gross (G)

e) Oersted (oe)

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28.3.7. What is the use of a bubble chamber?

a) to accelerate charged particles before they move into a magnetic field

b) to allow the trajectory of charged particles moving in a magnetic field to be observed and measured

c) to make a magnetic field within a region of space uniform

d) to increase the mass of charged particles so that their trajectories are more easily observed

e) to charge a neutral particle or the increase the charge on a particle before it enters a magnetic field

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28.3.8. What is Right-Hand Rule used to determine?

a) Given the directions of the magnetic field and the velocity of a charged particle, it is used to find the direction of the magnetic force on the particle.

b) Given the directions of the magnetic field and magnetic force on a charged particle, it is used to determine the magnitude and sign of charge on the particle.

c) Given the magnitude and sign of the charge on a particle and the direction of the magnetic force, it is used to determine the net force on the particle.

d) It is used to determine the direction of the "reaction force" when applying Newton's third law of motion to the particle.

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28.4.1. J.J. Thompson discovered which of the following with his crossed fields experiment?

a) magnetic field

b) electrons

c) magnetic monopoles

d) protons

e) neutrons

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28.4.2. Which of the following scientists is credited with the discovery of the electron?

a) Planck

b) Curie

c) Maxwell

d) Thompson

e) Fermi

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28.5.1. Which one of the following quantities can be measured by performing a Hall effect measurement?

a) magnetic monopole strength

b) charge of the electron

c) number density of charge carriers

d) acceleration of an electron

e) work function

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28.6.1. A negatively-charged particle is slowly moving as it enters a region that has a constant magnetic field. If the velocity of the particle is initially perpendicular to the magnetic field, what will be the subsequent motion of the particle?

a) It will follow a helical path around the magnetic field lines.

b) It will follow a circular path in the plane perpendicular to the magnetic field lines.

c) It will follow a straight line path in the same direction as it was initially traveling.

d) It will follow a circular path in a plane parallel to the magnetic field lines.

e) It is impossible to predict the path the particle will follow.

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28.6.2. A negatively-charged particle is slowly moving as it enters a region that has a constant magnetic field. If the velocity of the particle is initially parallel to the magnetic field, what will be the subsequent motion of the particle?

a) It will follow a helical path around the magnetic field lines.

b) It will follow a circular path in the plane perpendicular to the magnetic field lines.

c) It will follow a straight line path in the same direction as it was initially traveling.

d) It will follow a circular path in a plane parallel to the magnetic field lines.

e) It is impossible to predict the path the particle will follow.

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28.6.3. What must the initial state of motion of a charged particle be if it will follow a helical path in a magnetic field?

a) It must be moving at an angle that is neither parallel to nor perpendicular to the magnetic field.

b) It must be moving parallel to the magnetic field.

c) It must be moving perpendicular to the magnetic field.

d) It must be moving in the direction opposite to the magnetic field.

e) It must be initially at rest when it is placed in the magnetic field.

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28.6.4. An electron is traveling due south when it enters a uniform magnetic field directed due west. Which of the following statements concerning this situation is false?

a) The subsequent motion of the electron will be the same as if there were an electric field directed due west and no magnetic field present.

b) The electron will follow a curved path.

c) The direction of the magnetic force on the electron will vary with time.

d) The magnitude of the magnetic force will be constant with time.

e) The direction of the magnetic field and the direction of the magnetic force on the electron are perpendicular to one another.

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28.7.1. Which of the following instruments is used in the field of high energy physics to accelerate protons to very high energies along circular paths?

a) magnetron

b) synchrotron

c) ignitron

d) betatron

e) quartertron

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28.8.1. A long wire carries a current toward the north in a magnetic field that is directed vertically downward. What is the direction of the magnetic force on the wire?

a) west

b) north

c) east

d) vertically upward

e) vertically downward

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28.8.2. A long wire carries a current toward the east in a magnetic field that is directed due south. What is the direction of the magnetic force on the wire?

a) west

b) north

c) east

d) vertically upward

e) vertically downward

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28.8.3. Which one of the following parameters is not used to determine the magnetic force on a current-carrying wire in a magnetic field?

a) length of the wire

b) radius of the wire

c) direction of the magnetic field with respect to the direction of the current

d) the strength of the magnetic field

e) the magnitude of the electric current

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28.10.1. Consider the following quantities: (1) current, (2) resistance, (3) coil area, (4) wire cross-sectional area, and (5) magnetic field. Upon which of the quantities is the magnetic dipole moment of a current carrying coil dependent?

a) 1 and 5 only

b) 1 and 2 only

c) 2 and 3 only

d) 1, 3, 4, and 5

e) 1 and 3 only

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28.10.2. A magnetic dipole has two stable orientations in a magnetic field. At what two angles relative to the magnetic field direction are these orientations?

a) 0° and 90°

b) 0° and 180°

c) 90° and 270°

d) 45° and 135°

e) 45° and 90°

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28.10.3. At what orientation angle relative to the magnetic field direction does the magnetic potential energy of a magnetic dipole have its largest value?

a) 0°

b) 45°

c) 90°

d) 135°

e) 180°

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28.10.4. At what orientation angle relative to the magnetic field direction does the torque of a magnetic dipole have its largest value?

a) 0°

b) 45°

c) 90°

d) 135°

e) 180°