

## Module 07 Baseline Quiz

Read sections 11.1 - 11.7

1. What is the SI unit for magnetic field?
  - a) Tesla
  - b) Torr
  - c) Henry
  - d) Farad
  - e) None of the above.
2. How does the magnetic force differ from the electric force?
  - a) The force does not depend on the sign of the charge.
  - b) The force does not depend on the magnitude of the charge.
  - c) The force is always perpendicular to the field.
  - d) The force is always in the opposite direction of the field.
  - e) None of the above.
3. If a proton is moving in the positive  $y$  direction and a magnetic field points in the positive  $z$  direction, what direction will the proton be accelerated?
  - a) The positive  $x$  direction.
  - b) The positive  $z$  direction.
  - c) The negative  $z$  direction.
  - d) The negative  $x$  direction.
  - e) None of the above.
4. If an electron is moving in the positive  $z$  direction and a magnetic field points in the positive  $x$  direction, what direction will the electron be accelerated?
  - a) Actually, the acceleration it will be zero
  - b) The negative  $x$  direction.
  - c) The negative  $y$  direction.
  - d) The negative  $z$  direction.
  - e) None of the above.

5. What does helical motion refer to?

- The motion of a charged particle traveling through a magnetic field when its velocity is perfectly perpendicular to the magnetic field lines.
- The motion of a charged particle traveling through a magnetic field when its velocity has a parallel component to the magnetic field lines.
- The motion of a charged particle traveling through a magnetic field when its velocity perfectly parallel to the magnetic field lines.
- The motion of a charged particle traveling through a magnetic field when the field intensity is time-varying.
- None of the above.

6. What is the cause of the force exerted on a current-carrying wire by a magnetic field?

- The magnetic force on the individual charges moving in the current.
- The magnetic force on the nuclei of the atoms of the conducting material.
- The magnetic force on the electrons in orbit around atom nuclei of the conducting material.
- The time-dependence of the magnetic field at the position of the wire that carries current.
- None of the above.

7. What is the magnetic dipole moment for a circular loop of current with current  $I$  and diameter  $D$ ?

- $IA\hat{n}$
- $\frac{1}{4}ID^2\hat{n}$
- $-\frac{1}{4}ID^2\hat{n}$
- $\vec{D} \times \vec{B}$
- None of the above.

8. In which case(s) will a torque be exerted on a magnetic dipole moment?

- When the dipole moment vector points in the same direction as the magnetic field.
- When the dipole moment vector points in the opposite direction of the magnetic field.
- When the dipole moment vector points perpendicular to the direction of the magnetic field.
- When the dipole moment vector points in a direction making a 45 degree angle with the magnetic field.
- None of the above.

9. What is the Hall effect?

- The observation that electrons moving through a conductor can still experience a magnetic force.
- The observation that a magnetic field will exert a force on charges that move through it.
- The observation that a potential difference between the edges of a conducting strip that carries current will form if the strip is placed in a magnetic field.
- None of the above.

10. What is the potential energy of an electric dipole in a magnetic field?

- a)  $U = -\vec{\mu} \times \vec{B}$
- b)  $U = \vec{\mu} \times \vec{B}$
- c)  $U = -\vec{\mu} \cdot \vec{B}$
- d)  $U = \vec{\mu} \cdot \vec{B}$
- e) None of the above.