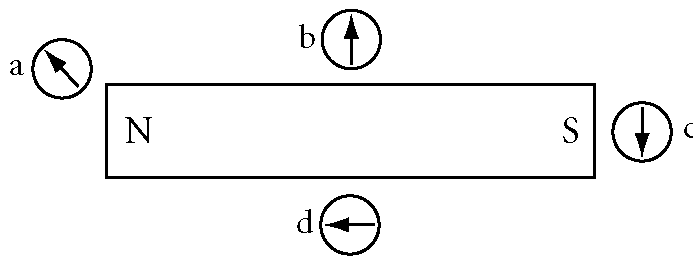


Magnetism - Sample Test

Multiple Choice

Identify the letter of the choice that best completes the statement or answers the question.

- Which of the following situations is *not* true for magnets?
 - Like poles repel each other.
 - Unlike poles repel each other.
 - North poles repel each other.
 - A north pole and a south pole will attract each other.
- Where is the magnitude of the magnetic field around a permanent magnet greatest?
 - The magnitude is greatest close to the poles.
 - The magnitude is greatest far from the poles.
 - The magnitude is equal at all points on the field.
 - The magnitude is greatest halfway between poles.



- Which compass needle orientation in the figure above might correctly describe the magnet's field at that point?
 - a
 - b
 - c
 - d
- A microscopic magnetic region composed of a group of atoms whose magnetic fields are aligned in a common direction is called a(n) _____. In most materials, when these groups are randomly distributed, the substance will show _____ no magnetism.
 - domain; no
 - pole; some
 - cell; unusual
 - ion; strong
- In a permanent magnet,
 - domain alignment persists after the external magnetic field is removed.
 - domain alignment becomes random after the external magnetic field is removed.
 - domains are always randomly oriented.
 - the magnetic fields of the domains cancel each other.
- Which of the following statements about Earth's magnetic field is true?
 - The geographic North Pole of Earth and Earth's magnetic north pole are at the same location.
 - The geographic South Pole of Earth and Earth's magnetic north pole are relatively close to each other.
 - The north needle of a compass always points to the geographic North Pole of Earth.
 - The north needle of a compass points to Earth's magnetic north pole.
- When an iron rod is inserted into a solenoid coil's center, the magnetic field produced by the current in the loops
 - causes the iron to return to an unmagnetized state.
 - forces the domain in the iron out of alignment.
 - causes random orientation of the domains in the iron.
 - causes alignment of the domains in the iron.
- Which of the following modifications to a solenoid would be most likely to decrease the strength of its magnetic field?
 - removing its iron rod core and increasing the number of coils
 - increasing the current and reducing the number of coils
 - reducing the number of coils and inserting an iron core
 - decreasing the current and reducing the number of coils

9. Under which of the following conditions is the net magnetic force on a charged particle equal to zero?
- when the particle is stationary
 - when the particle is moving parallel to the magnetic field
 - when the particle is not charged
 - all of the above
10. An electron that moves with a speed of 3.0×10^4 m/s perpendicular to a uniform magnetic field of 0.40 T experiences a force of what magnitude? ($q_e = 1.60 \times 10^{-19}$ C)
- 2.2×10^{24} N
 - 1.9×10^{15} N
 - 4.8×10^{14} N
 - 0 N
11. The direction of the force on a current-carrying wire in an external magnetic field is
- perpendicular to the current only.
 - perpendicular to the magnetic field only.
 - perpendicular to both the current and the magnetic field.
 - parallel to the current and to the magnetic field.
12. What is the path of an electron moving perpendicular to a uniform magnetic field?
- straight line
 - circle
 - ellipse
 - parabola
13. A 2.0 m wire segment carrying a current of 0.60 A oriented parallel to a uniform magnetic field of 0.50 T experiences a force of what magnitude?
- 0.60 N
 - 0.30 N
 - 0.15 N
 - 0.0 N
14. A stationary positive charge, Q , is located in a magnetic field, B , which is directed toward the right. What is the direction of the magnetic force on Q ?
- toward the right
 - up
 - down
 - There is no magnetic force.
15. Consider two long, straight, parallel wires, each carrying a current I . If the currents move in opposite directions,
- the two wires will attract each other.
 - the two wires will repel each other.
 - the two wires will exert a torque on each other.
 - neither wire will exert a force on the other.
16. A current in a long, straight wire produces a magnetic field. These magnetic field lines
- radiate out from the wire to infinity.
 - come in from infinity to the wire.
 - form circles that pass through the wire.
 - form circles that go around the wire.
17. Consider two long, straight, parallel wires, each carrying a current I . If the currents move in the same direction,
- the two wires will attract each other.
 - the two wires will repel each other.
 - the two wires will exert a torque on each other.
 - neither wire will exert a force on the other.

Problem

18. An electron moves north at a velocity of 9.8×10^4 m/s and has a magnetic force of 5.6×10^{-18} N west exerted on it. If the magnetic field points upward, what is the magnitude of the magnetic field?
19. A wire 48 m long carries a current of 18 A from west to east. If a magnetic field of 8.3×10^{-4} T directed toward the south is acting on the wire, find the direction and magnitude of the magnetic force.