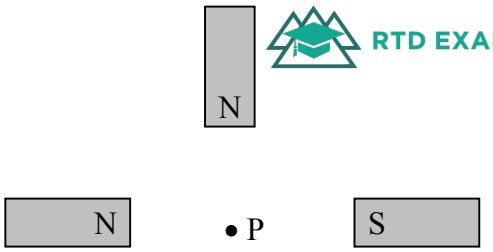
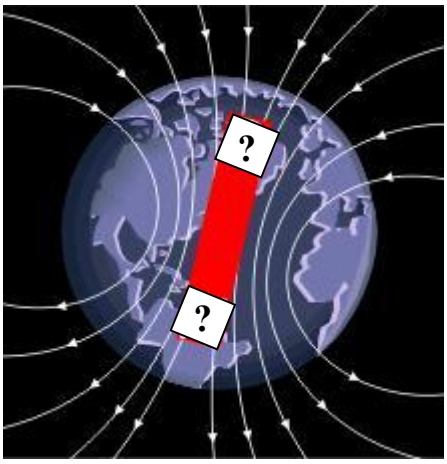
UNIT 2 REVIEW #2: ELECTROMAGNETISM

RTD EXAM PREP

1. Using a vector sum diagram, determine the direction of the net magnetic field at P.

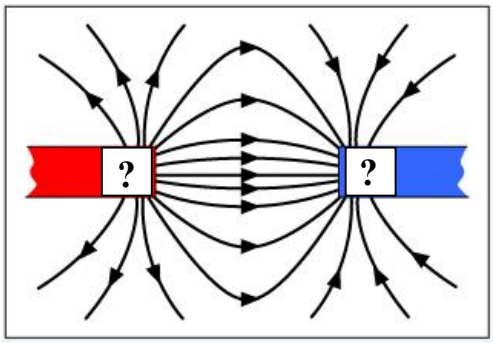


2. For the Earth's magnetic field shown, determine the poles of the magnet.

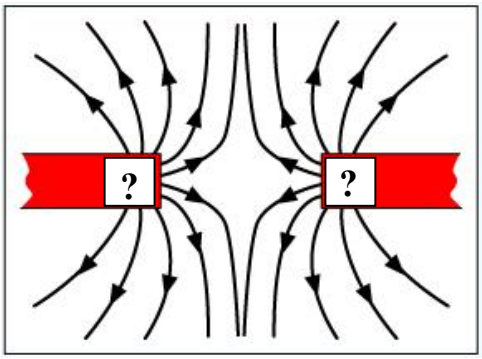


3. Determine the poles of the magnets for the fields below:

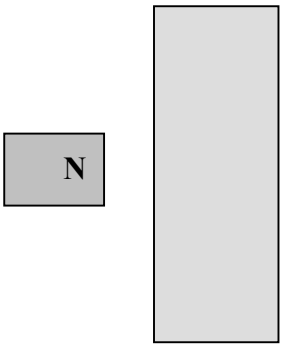
a)



b)



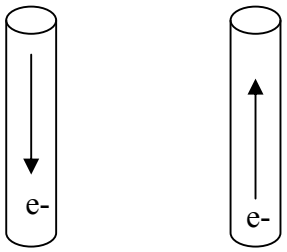
4. Using domain theory explain how the North end of a magnet can stick to a refrigerator door.



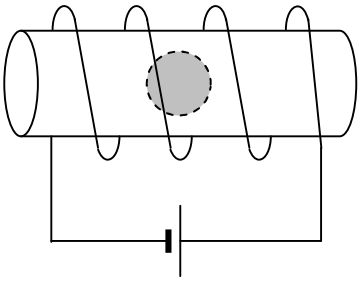
5. Two parallel wires have current going in opposite directions.

   a) Determine the direction of the magnetic field around each.

   b) Do the wires attract or repel?

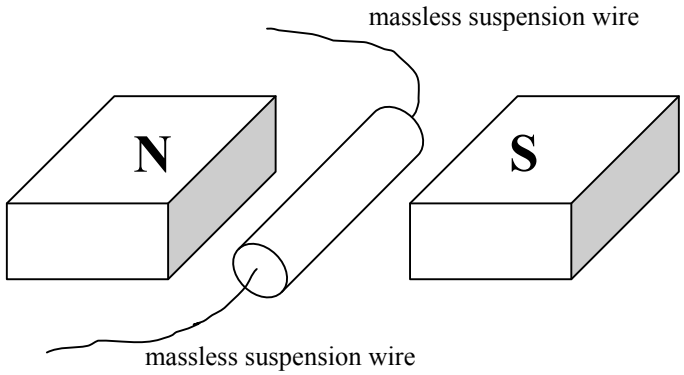


6. A compass is located inside of the solenoid shown. Determine the direction the compass points.



7. An 11.5 cm long current-carrying wire is placed into a 270 mT magnetic field that is directed East. If the wire has a total charge of 44.0 C move through it in 8.62 seconds, and the current moves out of the page, then determine the magnitude and direction of the magnetic force on the wire.

8. A 7.0 cm long wire is attached to massless suspension wires and placed inside of a 450 mT magnetic field. When current is run through the wire, it becomes suspended (i.e. there is no tension in the suspension wires).



If the mass of the wire is 8.10 g, then determine the magnitude and direction of the current through the wire.

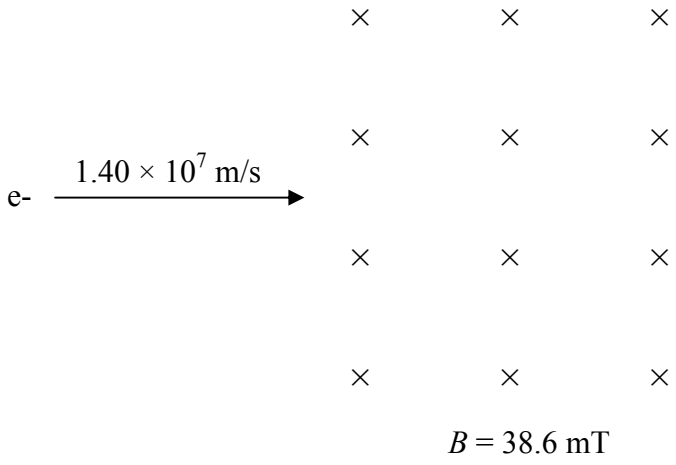
9. An alpha particle is moving at 7.20×10^5 m/s towards the bottom of the page. If it experiences a magnetic force of 3.19×10^{-11} N to the left, then determine the magnitude and direction of the external magnetic field.

10. An electron, travelling to the right at 1.40×10^7 m/s, enters a uniform 38.6 mT magnetic field that is directed into the page.

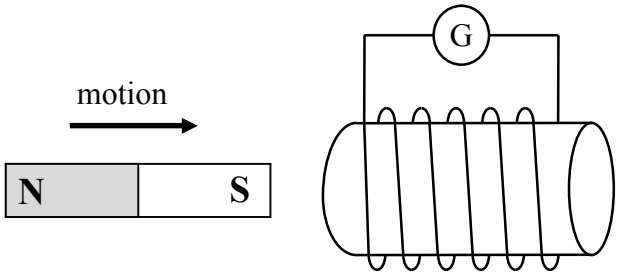
    Determine:

    a) whether the electron moves in a clockwise or counterclockwise motion

    b) the radius of its path



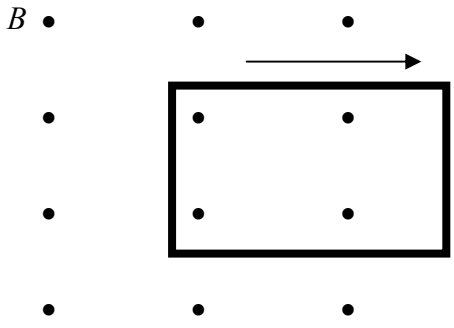
11. The South end of a magnet is moving towards a solenoid, as shown below.



    Determine the direction of the electron flow through the galvanometer G.

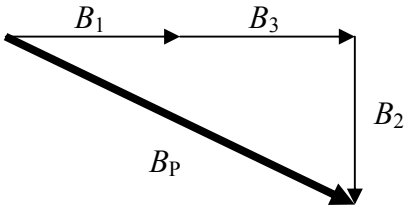
12. A loop of wire is being removed from a uniform magnetic field, as shown.

    Determine the direction of the electron flow through the loop.

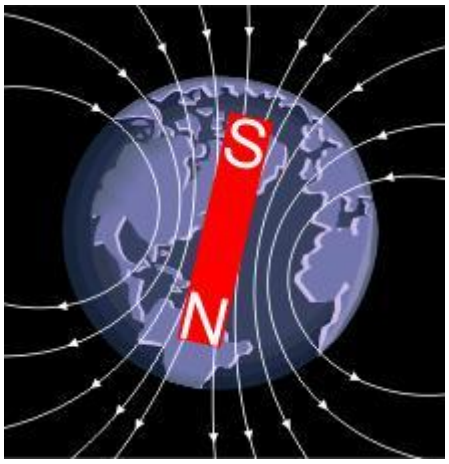


SOLUTIONS

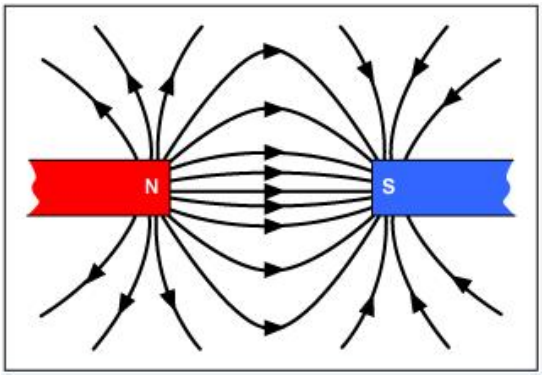
1.



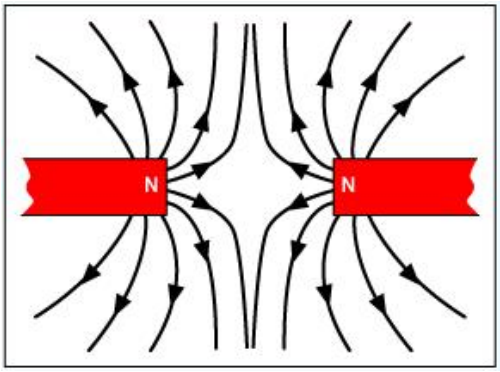
2.



3. a)

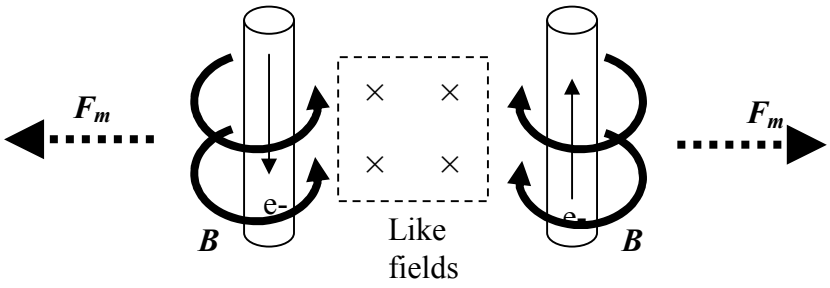


b)



4. The refrigerator door must be made of ferromagnetic material, which is composed of magnetic domains. At first, the fridge door is unmagnetized, which means the domains have random directions (with a net magnetic field of zero). When the magnet is brought near to the fridge, it creates a magnetic field directed away from the North pole. The domains align in the same direction as the external magnetic field. This induces the opposite pole in the closest side of the fridge door, which attracts the magnet.

5. They repel.



6. Points towards the left.

7. 0.158 N South

8. 2.5 A directed into the page

9. 138 T directed out of the page

10. a) clockwise
    b) 2.07 mm

11. Electrons flow to the right through G

12. Electrons flow clockwise around the loop.