**Answer on Question #54153, Physics Electric Circuit**

From a top view perspective, in what direction does the north pole of the compass needle point to when the compass uses positioned around the vertical current carrying straight conductor?

**Answer:**

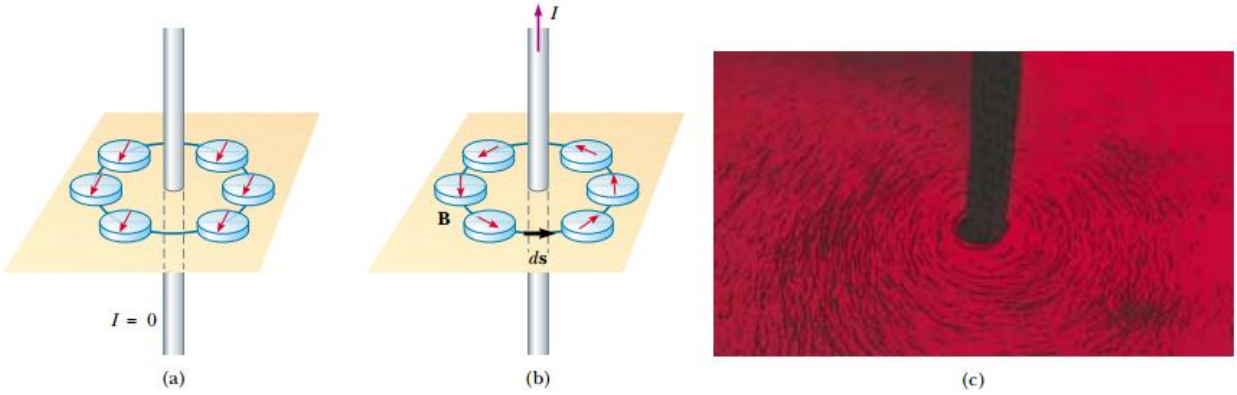


*Fig.1 (a) When no current is present in the wire, all compass needles point in the same direction (toward the Earth's north pole). (b) When the wire carries a strong current, the compass needles deflect in a direction tangent to the circle, which is the direction of the magnetic field created by the current. (c) Circular magnetic field lines surrounding a current-carrying conductor, displayed with iron filings.*

Oersted's 1819 discovery about deflected compass needles demonstrates that a current-carrying conductor produces a magnetic field. Figure 1a shows how this effect can be demonstrated in the classroom. Several compass needles are placed in a horizontal plane near a long vertical wire. When no current is present in the wire, all the needles point in the same direction (that of the Earth's magnetic field), as expected. When the wire carries a strong, steady current, the needles all deflect in a direction tangent to the circle, as shown in Figure 1b. These observations demonstrate that the direction of the magnetic field produced by the current in the wire is

consistent with the right-hand rule described in Figure 2. When the current is reversed, the needles in Figure 1b also reverse

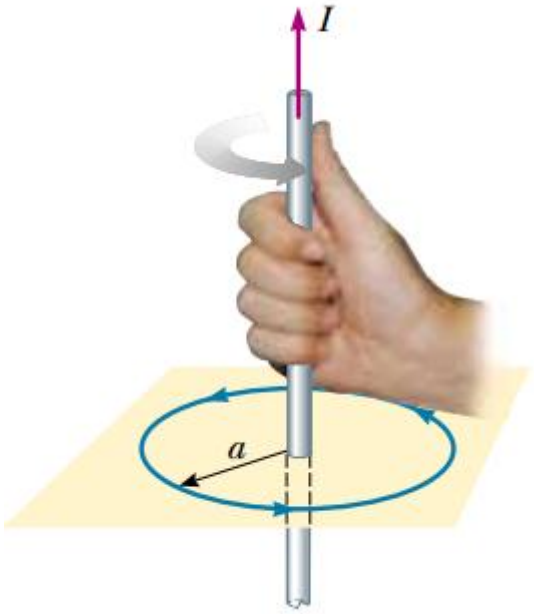


*Fig.2*