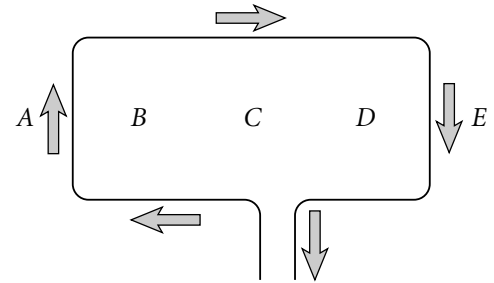


Chapter
21

HOLT PHYSICS
Mixed Review

Magnetism

1. A wire frame carries an electric current in the direction shown. Consider the magnetic field contributed by each segment of the frame at points A, B, C, D, and E.



- a. Use the convention symbols (\times , \bullet , and \rightarrow) to represent the direction of magnetic fields created at point A by the vertical segments of the frame. Do they have the same direction? the same strength?

- b. Repeat for the horizontal segments.

- c. Answer items a and b for points B, C, D, and E, and fill in the table below.

| | leftmost | rightmost | upper | lower |
|---|----------|-----------|-------|-------|
| B | | | | |
| C | | | | |
| D | | | | |
| E | | | | |

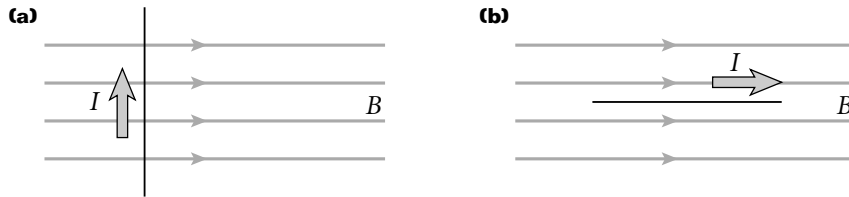
- d. Do the contributions of each segment to the magnetic field cancel out at the center? Explain.

- e. Is the magnetic field resulting from the combined effects of the four sides of the frame stronger inside or outside the frame?

Chapter **21**

HOLT PHYSICS
Mixed Review *continued*

2. A 2.0 m long conducting wire has a current of 5.0 in a uniform magnetic field of 0.43 T. The field is parallel to the x -axis.



- a. What is the force on the wire when it is vertical, parallel to the y -axis as shown a?

- b. What is the force on the wire when it is horizontal, parallel to the x -axis as shown in b?

3. The wire in item 2 is bent to form a $0.50\text{ m} \times 0.50\text{ m}$ square carrying the same 5.0 A current, with the positive charges moving clockwise in the frame. The frame is in the same magnetic field ($B = 0.43\text{ T}$).

- a. Sketch a diagram of the situation. Use arrows to indicate the direction of the current in each segment of the frame.
- b. Find the forces acting on each side of the frame. Specify their magnitude and direction.

- c. Do the forces on the frame cancel each other? Will the frame be able to move? Will it be able to rotate? Explain.

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