

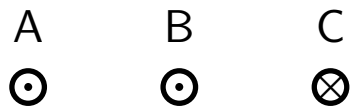
Warm Up Question 1

The cords that connect a household appliance to the mains outlet consist of two strands of wire that run parallel to each other. At any instant the current in one strand is opposite to that in the other strand. Describe the direction of the force exerted by one strand on the other. In household circuits, the currents in the strands simultaneously reverse direction many times every second. Does this change the direction of the force exerted by one strand on the other? Explain your answer.

1. Repel. Does not change.
2. Attractive. Does not change.
3. Reverses direction. Current reverses direction.

Question 1

Three wires, each perpendicular to the board, carry currents of identical magnitudes. The distance between adjacent wires are equal.

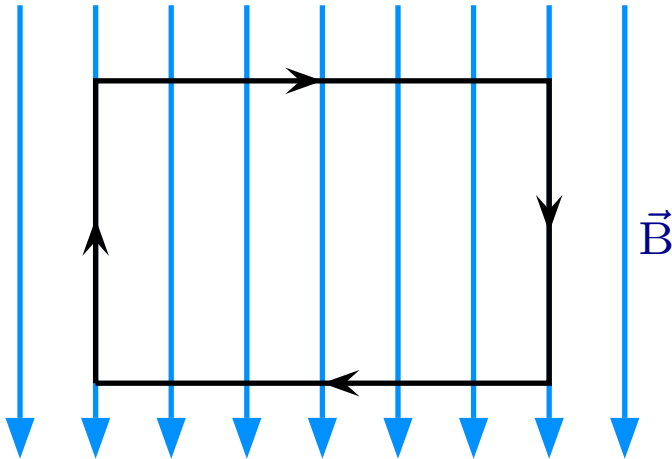


Rank the wires in order of the magnitudes of the net magnetic force on each.

1. $F_A = F_B = F_C$
2. $F_C = F_A > F_B = 0$
3. $F_C = F_A > F_B = 0$
4. $F_B > F_C = F_A$
5. $F_B > F_C > F_A$

Question 2

A rectangular loop is placed into the indicated magnetic field.

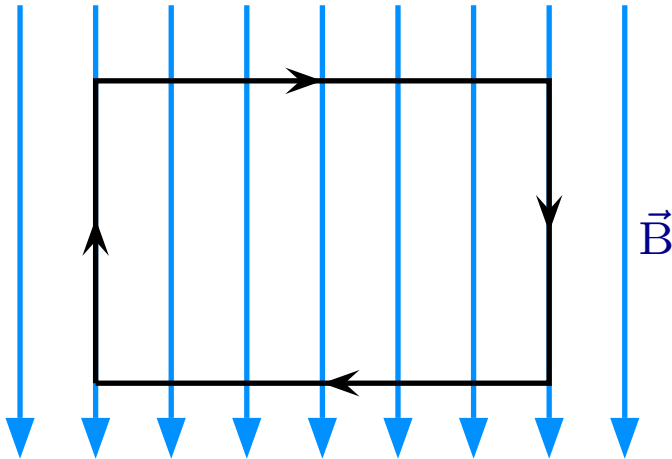


Which (choose one) of the following is true regarding the forces exerted by the magnetic field on the various parts?

1. $\vec{F}_{\text{left side}} = 0$ and $\vec{F}_{\text{right side}} = 0$.
2. $\vec{F}_{\text{left side}}$ is \downarrow and $\vec{F}_{\text{right side}}$ is \downarrow .
3. $\vec{F}_{\text{left side}}$ is \downarrow and $\vec{F}_{\text{right side}}$ is \uparrow .
4. $\vec{F}_{\text{left side}}$ is \uparrow and $\vec{F}_{\text{right side}}$ is \downarrow .
5. $\vec{F}_{\text{left side}}$ is \uparrow and $\vec{F}_{\text{right side}}$ is \uparrow .

Question 3

A rectangular loop is placed into the indicated magnetic field.

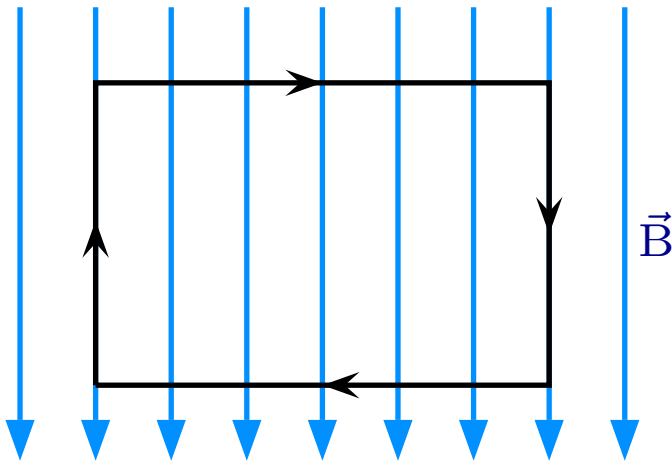


Which (choose one) of the following is true regarding the forces exerted by the magnetic field on the various parts?

1. $\vec{F}_{\text{top side}} = 0$.
2. $\vec{F}_{\text{top side}}$ is \downarrow .
3. $\vec{F}_{\text{top side}}$ is \rightarrow .
4. $\vec{F}_{\text{top side}}$ is out of screen/page.
5. $\vec{F}_{\text{top side}}$ is into screen/page.

Question 4

A rectangular loop is placed into the indicated magnetic field.



Which (choose one) of the following is true regarding the forces exerted by the magnetic field on the various parts?

1. The entire loop moves out of the screen.
2. The entire loop moves into of the screen.
3. The loop rotates with its center fixed.
4. The loop rotates and its center moves out of the screen.
5. The loop rotates and its center moves into the screen.