CENGAGE | WEBASSIGN

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← PHYS 2401, section 201, Summer 2 2022

Magnetism (Homework)

INSTRUCTOR
Keith West
Texas Tech University

Current Score

QUESTION	1	2	3	4	5	6	7	8	9	10	11
POINTS	–/4	–/2	–/2	–/2	–/5	–/1	–/3	–/6	–/2	–/1	–/3

TOTAL SCORE

–/31	0.0%

Due Date

THU, AUG 4, 2022
11:58 PM CDT

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Assignment Submission & Scoring

Assignment Submission

For this assignment, you submit answers by question parts. The number of submissions remaining for each question part only changes if you submit or change the answer.

Assignment Scoring

Your last submission is used for your score.

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1. **[–/4 Points]** DETAILS **SERPSE10 28.1.OP.001.**

MY NOTES ASK YOUR TEACHER

Determine the initial direction of the deflection of charged particles as they enter the magnetic fields shown in the figure below.

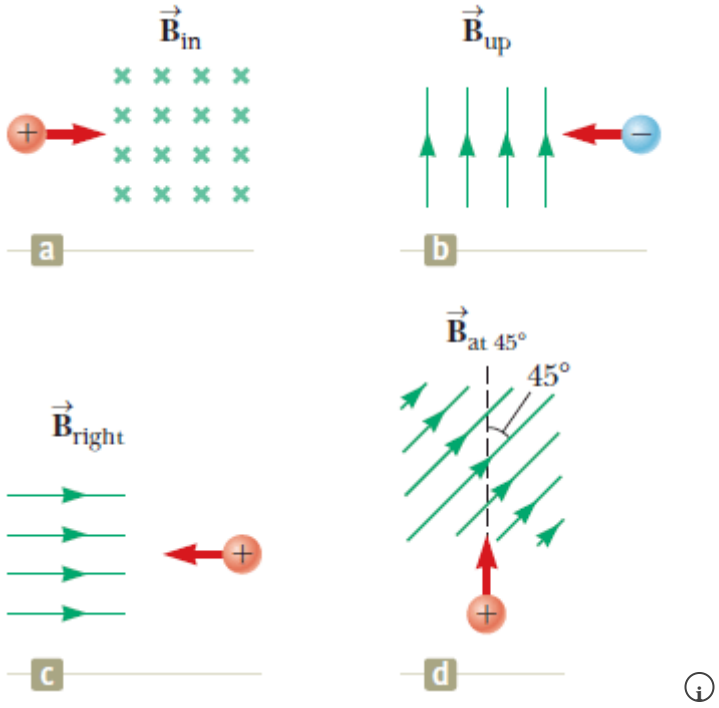

Figure (a) ---Select---

Figure (b) ---Select---

Figure (c) ---Select---

Figure (d) ---Select---

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2. [–/2 Points] DETAILS SERPSE10 28.1.P.005.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

A proton travels with a speed of 4.90×10^6 m/s at an angle of 63° with the direction of a magnetic field of magnitude 0.250 T in the positive *x*-direction.

(a) What is the magnitude of the magnetic force on the proton?

[ ] N

(b) What is the proton's acceleration?

[ ] m/s^2

Need Help? Read It

3. [–/2 Points] DETAILS SERPSE10 28.2.OP.006.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

An electron moves in a circular path with a speed of 1.32×10^7 m/s in the presence of a uniform magnetic field with a magnitude of 1.88 mT. The electron's path is perpendicular to the field.

(a) What is the radius (in cm) of the circular path?

[ ] cm

(b) How long (in s) does it take the electron to complete one revolution?

[ ] s

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4. [–/2 Points] DETAILS SERPSE10 28.3.P.014.MI.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

A cyclotron designed to accelerate protons has a magnetic field of magnitude 0.510 T over a region of radius 1.40 m.

(a) What is the cyclotron frequency?

[ ] rad/s

(b) What is the maximum speed acquired by the protons?

[ ] m/s

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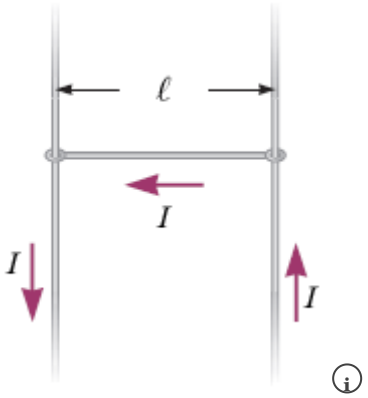
5. [–/5 Points] DETAILS SERPSE10 28.4.P.026.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Consider the system pictured in the figure below. A 15.2-cm horizontal wire of mass 13.9 g is placed between two thin, vertical conductors, and a uniform magnetic field acts perpendicular to the page. The wire is free to move vertically without friction on the two vertical conductors. When a 4.95-A current is directed as shown in the figure, the horizontal wire moves upward at constant velocity in the presence of gravity.



(a) What forces act on the horizontal wire? (Select all that apply.)

- ☐ gravitational force
- ☐ electric force
- ☐ magnetic force

(b) Under what condition is the wire able to move upward at constant velocity?

This answer has not been graded yet.

(c) Find the magnitude and direction of the minimum magnetic field required to move the wire at constant speed.

magnitude [ ] T

direction ---Select---

(d) What happens if the magnetic field exceeds this minimum value?

This answer has not been graded yet.

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6. [–/1 Points] DETAILS SERPSE10 28.5.P.030.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

A 51.0-turn circular coil of radius 4.90 cm can be oriented in any direction in a uniform magnetic field having a magnitude of 0.530 T. If the coil carries a current of 27.1 mA, find the magnitude of the maximum possible torque exerted on the coil.

N · m

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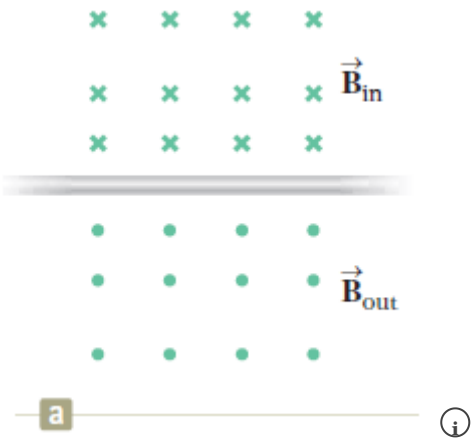
7. [–/3 Points] DETAILS SERPSE10 29.1.OP.001.

MY NOTES ASK YOUR TEACHER

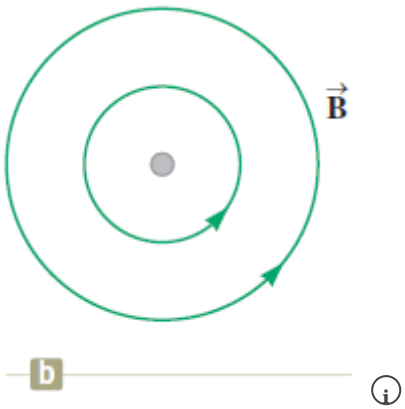
Consider the following figures. Determine the direction of the current in the current-carrying wire that produces the field indicated in the figure.

(a)



- ○ out of the screen
- ○ into the screen
- ○ toward the left
- ○ toward the right
- ○ toward the top of the screen
- ○ toward the bottom of the screen

(b)



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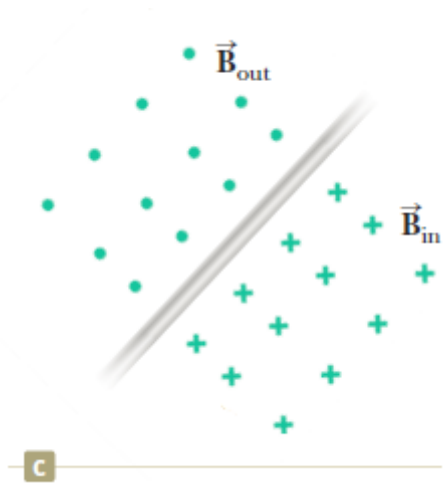
- ○ toward the left
- ○ toward the right
- ○ toward the top of the screen

- ○ toward the bottom of the screen

(c)



- ○ out of the screen
- ○ into the screen
- ○ lower right to upper left
- ○ lower left to upper right
- ○ upper right to lower left
- ○ upper left to lower right

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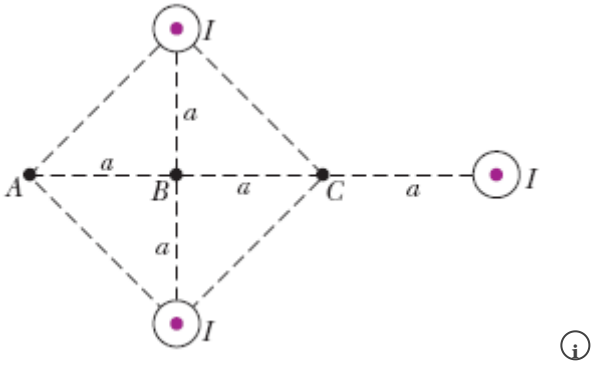
8. [–/6 Points] DETAILS SERPSE10 29.1.P.007.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Three long, parallel conductors each carry a current of I = 1.70 A. The figure below is an end view of the conductors, with each current coming out of the page. Taking a = 1.10 cm, determine the magnitude and direction of the magnetic field at the following points.



(a) point A

magnitude [ ] μT

direction ---Select---

(b) point B

magnitude [ ] μT

direction ---Select---

(c) point C

magnitude [ ] μT

direction ---Select---

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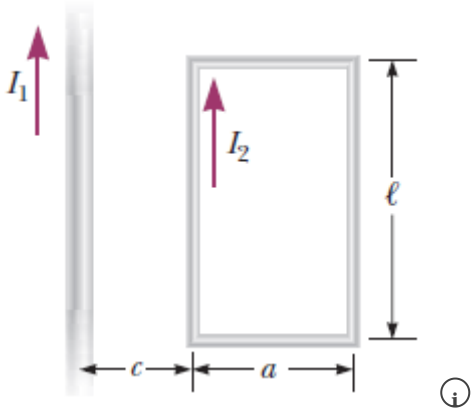
9. [–/2 Points] DETAILS SERPSE10 29.2.OP.012.MI.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

In the figure below, the current in the long, straight wire is I_1 = 7.20 A and the wire lies in the plane of the rectangular loop, which carries a current I_2 = 10.0 A. The dimensions in the figure are c = 0.100 m, a = 0.150 m, and ℓ = 0.510 m. Find the magnitude and direction of the net force exerted on the loop by the magnetic field created by the wire.

magnitude [ ] μN

direction ---Select---



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10. [–/1 Points] DETAILS SERPSE10 29.2.OP.014.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Two long, parallel, current-carrying wires lie in an xy-plane. The first wire lies on the line y = 0.380 m and carries a current of 33.5 A in the $+x$ direction. The second wire lies along the x-axis. The wires exert attractive forces on each other, and the force per unit length on each wire is 290 μN/m. What is the y-value (in m) of the line in the xy-plane where the total magnetic field is zero?

[ ] m

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11. [–/3 Points] DETAILS SERPSE10 29.4.OP.019.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

A single-turn square loop of wire, 2.00 cm on each edge, carries a clockwise current of 0.240 A. The loop is inside a solenoid, with the plane of the loop perpendicular to the magnetic field of the solenoid. The solenoid has 30.0 turns/cm and carries a clockwise current of 15.0 A.

(a) Find the force on each side of the loop.

magnitude [ ] μN

direction ---Select---

(b) Find the magnitude of the torque acting on the loop.

[ ] N · m

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