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**Include file name:** Physics\_Worksheet\_0033

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**Question 1**

2 / 2 points

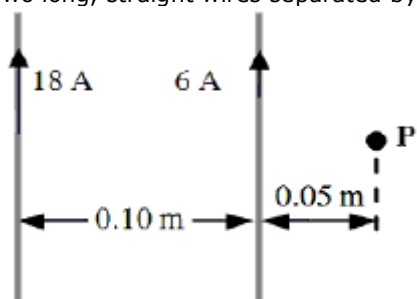
A charged particle is launched with a velocity of  $5.2 \times 10^4$  m/s at an angle of  $35^\circ$  with respect to a 0.0045-T magnetic field. If the magnetic field exerts a force of 0.0026 N on the particle, determine the magnitude of the charge on the particle.

- a) 19  $\mu\text{C}$
- b) 15  $\mu\text{C}$
- c) 11  $\mu\text{C}$
- d) 27  $\mu\text{C}$
- e) 23  $\mu\text{C}$

**Question 2**

2 / 2 points

Two long, straight wires separated by 0.10 m carry currents of 18 A and 6 A in the same direction as shown.



Reference: Ref 21-6

Determine the magnitude of the magnetic field at the point **P**.

- a)  $4.8 \times 10^{-5}$  T
- b)  $7.2 \times 10^{-5}$  T
- c)  $2.4 \times 10^{-5}$  T
- d)  $9.6 \times 10^{-5}$  T
- e) zero tesla

**Question 3**

2 / 2 points

A proton is traveling south as it enters a region that contains a magnetic field. The proton is deflected downward toward the earth. What is the direction of the magnetic field?

- a) north
- b) downward, toward the earth
- c) west
- d) south
- e) east

2 / 2 points

**Question 4**

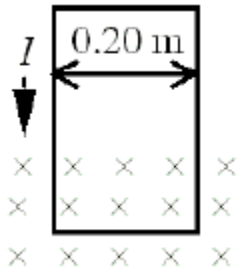
A proton traveling due west in a region that contains only a magnetic field experiences a vertically *upward* force (away from the surface of the earth). What is the direction of the magnetic field?

- a) down
- b) north
- c) east
- d) south
- e) west

**Question 5**

2 / 2 points

A loop of wire with a weight of 0.55 N is oriented vertically and carries a current  $I = 2.25$  A. A segment of the wire passes through a magnetic field directed into the plane of the page as shown. The net force on the wire is measured using a balance and found to be zero. What is the magnitude of the magnetic field?

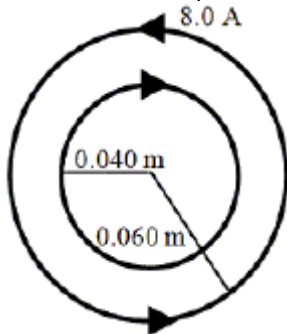


- a) 4.5 T
- b) 0.84 T
- c) 0.51 T
- d) 1.2 T
- e) zero tesla

**Question 6**

2 / 2 points

The figure shows two concentric metal loops, each carrying a current. The larger loop carries a current of 8.0 A and has a radius of 0.060 m. The smaller loop has a radius of 0.040 m. What is the value of a current in the smaller loop that will result in zero total magnetic field at the center of the system?

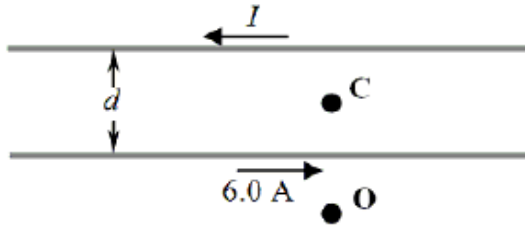


- a) 12 A
- b) 5.3 A
- c) 24 A
- d) 8.8 A
- e) 6.0 A

2 / 2 points

**Question 7**

Two long, straight, parallel wires separated by a distance  $d$  carry currents in opposite directions as shown in the figure. The bottom wire carries a current of 6.0 A. Point **C** is at the midpoint between the wires and point **O** is a distance  $0.50d$  below the 6-A wire as suggested in the figure. The total magnetic field at point **O** is zero tesla.



Reference: Ref 21-5

Determine the value of the current,  $I$ , in the top wire.

- a) This cannot be determined since the value of  $d$  is not specified.
- b) 6 A
- c) 3 A
- d) 18 A
- e) 2 A

**Question 8**

2 / 2 points

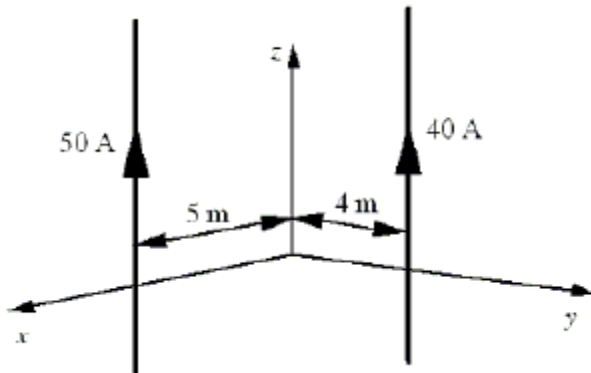
A circular coil consists of 5 loops each of diameter 1.0 m. The coil is placed in an external magnetic field of 0.5 T. When the coil carries a current of 4.0 A, a torque of magnitude 3.93 N-m acts on it. Determine the angle between the normal to the plane of the coil and the direction of the magnetic field.

- a)  $30^\circ$
- b)  $90^\circ$
- c)  $45^\circ$
- d)  $60^\circ$
- e)  $0^\circ$

**Question 9**

1 / 2 points

The drawing shows two long, thin wires that carry currents in the positive  $z$  direction. Both wires are parallel to the  $z$  axis. The 50-A wire is in the  $x$ - $z$  plane and is 5 m from the  $z$  axis. The 40-A wire is in the  $y$ - $z$  plane and is 4 m from the  $z$  axis. What is the magnitude of the magnetic field at the origin?

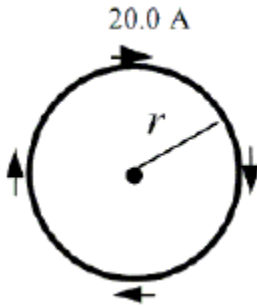


- a)  $1 \times 10^{-6}$  T
- b)  $6 \times 10^{-6}$  T
- c)  $3 \times 10^{-6}$  T
- d) zero tesla
- e)  $4 \times 10^{-6}$  T

**Question 10**

2 / 2 points

A wire is bent into the shape of a circle of radius  $r = 0.10$  m and carries a 20.0-A current in the direction shown.



Reference: Ref 21-8

Determine the magnetic moment of the loop.

- a)  $0.84 \text{ A} \cdot \text{m}^2$
- b)  $1.3 \text{ A} \cdot \text{m}^2$
- c)  $0.40 \text{ A} \cdot \text{m}^2$
- d)  $0.20 \text{ A} \cdot \text{m}^2$
- e)  $0.63 \text{ A} \cdot \text{m}^2$