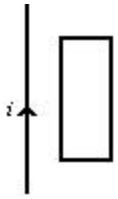
1. A 2-T uniform magnetic field makes an angle of 30° with the *z* axis. The magnetic flux through a 3-m^2 portion of the *xy* plane is:
   A) 2.0 Wb
   B) 3.0 Wb
   C) 5.2 Wb
   D) 6 Wb
   E) 12 Wb

2. A square loop of wire lies in the plane of the page. A decreasing magnetic field is directed into the page. The induced current in the loop is:
   A) counterclockwise
   B) clockwise
   C) zero
   D) depends upon whether or not *B* is decreasing at a constant rate
   E) clockwise in two of the loop sides and counterclockwise in the other two

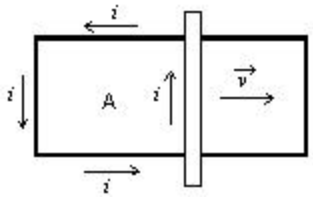
3. A long straight wire is in the plane of a rectangular conducting loop. The straight wire carries a constant current *i*, as shown. While the wire is being moved toward the rectangle the current in the rectangle is:



   A) zero
   B) clockwise
   C) counterclockwise
   D) clockwise in the left side and counterclockwise in the right side
   E) counterclockwise in the left side and clockwise in the right side

4. One hundred turns of insulated copper wire are wrapped around an iron core of cross-sectional area 0.100 m^2. The circuit is completed by connecting the coil to a 10-Ω resistor. The magnetic field along the coil axis is made to change from 1.00 T in one direction to 1.00 T is the other direction. The total charge that flows through the resistor in this process is:
   A) 10^{-2} C
   B) 2×10^{-2} C
   C) 1 C
   D) 2 C
   E) 0.20 C

5. The figure shows a bar moving to the right on two conducting rails. To make an induced current *i* in the direction indicated, a constant magnetic field in region A should be in what direction?

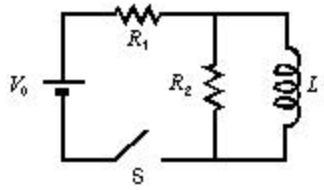


A) Right
B) Left
C) Into the page
D) Out of the page
E) Impossible, cannot be done with a constant magnetic field

6. A single loop of wire with a radius of 7.5 cm rotates about a diameter in a uniform magnetic field of 1.6 T. To produce a maximum emf of 1.0 V, it should rotate at:
A) 0
B) 2.7 rad/s
C) 5.6 rad/s
D) 35 rad/s
E) 71 rad/s

7. An 8.0-mH inductor and a 2.0-Ω resistor are wired in series to an ideal battery. A switch in the circuit is closed at time 0, at which time the current is 0. The current reaches half its final value at time:
A) 2.8 ms
B) 4.0 ms
C) 3 s
D) 170 s
E) 250 s

8. Immediately after switch S in the circuit shown is closed, the current through the battery shown is:



A) 0
B) V_0/R_1
C) V_0/R_2
D) $V_0/(R_1 + R_2)$
E) $V_0(R_1 + R_2)/(R_1R_2)$

Answer Key --

1. C
2. B
3. C
4. D
5. C
6. D
7. A
8. D