

Old Exams Chapter 30

Term 083

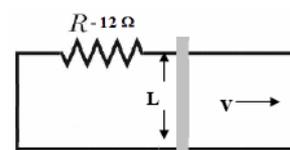
Q30.

A circular loop of radius 45 cm is moved with a speed of 10 m/s inside a region containing a constant magnetic field of magnitude 0.50 T. If the direction of the magnetic field is perpendicular to plane of the circular loop, what is the magnitude of the induced emf in the circular loop?

A) Zero

Q29.

A rod (length $L=10$ cm) moves on two horizontal frictionless conducting rails, as shown in Fig. 10. The magnetic field in the region is directed perpendicular to the plane of the rails and is uniform and constant. If a constant force of 0.60 N moves the bar at a constant velocity of 2.0 m/s, what is the current through the 12Ω resistor?



A) 0.32 A

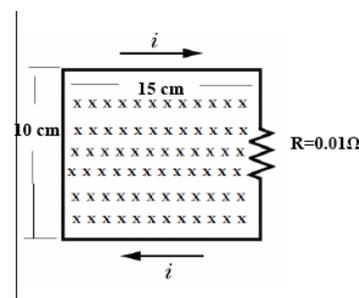
Q28.

In Dhahran, the total magnetic field of the Earth has been measured to be 0.54×10^{-4} T and it points downward at an angle of 53° below the horizontal. What is the magnetic flux through 1.0 m^2 of ground in Dhahran due to the Earth magnetic field?

A) 0.43×10^{-4} Wb

Q27.

The circuit is located in a region containing a magnetic field directed perpendicular into the page, as shown in Fig. 9. The induced current in the circuit is 0.45 A. At what rate is the magnitude of the magnetic field decreasing or increasing?



A) 0.30 T/s, decreasing

Term082

Q30.

A 2.0 m long copper wire, with a resistance of 5.0Ω , is formed into a square loop and placed perpendicular to a uniform magnetic field that is increasing at the constant rate of 10 mT/s . At what rate is thermal energy generated in the loop?

A) $1.3 \times 10^{-6} \text{ W}$

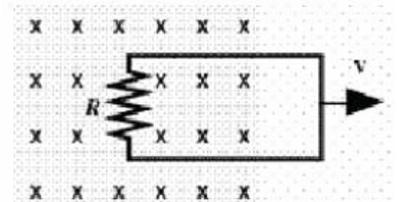
Q29.

A small circular loop of area 0.50 cm^2 is placed in the plane of, and concentric with, a large circular loop of radius 2.0 m . The current in the large loop is changed uniformly from $+100 \text{ A}$ to -100 A in a time interval of 0.50 s . Find the magnitude of the emf induced in the small loop in this time interval (Assume the field is uniform through the smaller loop).

A) $6.3 \times 10^{-9} \text{ V}$

Q28.

A circuit is pulled to the right at a constant speed $v = 9.0 \text{ m/s}$ in a uniform magnetic field with a 16-N force as shown in Figure 13. As the circuit moves, a current flows through the 4.0Ω resistor (R).



What is the magnitude and direction of the current in the circuit?

A) 6.0 A , clockwise