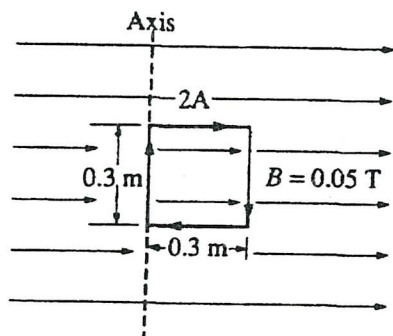


62. A 30-ohm resistor and a 60-ohm resistor are connected as shown above to a battery of emf 20 volts and internal resistance r . The current in the circuit is 0.8 ampere. What is the value of r ?

(A) 0.22Ω
 (B) 4.5Ω
 (C) 5Ω
 (D) 16Ω
 (E) 70Ω



63. A square loop of wire 0.3 meter on a side carries a current of 2 amperes and is located in a uniform 0.05-tesla magnetic field. The left side of the loop is aligned along and attached to a fixed axis. When the plane of the loop is parallel to the magnetic field in the position shown above, what is the magnitude of the torque exerted on the loop about the axis?

(A) $0.00225 \text{ N} \cdot \text{m}$
 (B) $0.0090 \text{ N} \cdot \text{m}$
 (C) $0.278 \text{ N} \cdot \text{m}$
 (D) $1.11 \text{ N} \cdot \text{m}$
 (E) $111 \text{ N} \cdot \text{m}$

64. A solid nonconducting sphere of radius R has a charge Q uniformly distributed throughout its volume. A Gaussian surface of radius r with $r < R$ is used to calculate the magnitude of the electric field E at a distance r from the center of the sphere. Which of the following equations results from a correct application of Gauss's law for this situation?

(A) $E(4\pi R^2) = \frac{Q}{\epsilon_0}$
 (B) $E(4\pi r^2) = \frac{Q}{\epsilon_0}$
 (C) $E(4\pi r^2) = \frac{Q}{\epsilon_0} \frac{3r^3}{4\pi R^3}$
 (D) $E(4\pi r^2) = \frac{Q}{\epsilon_0} \frac{r^3}{R^3}$
 (E) $E(4\pi r^2) = 0$