

**5.30** In the model of the hydrogen atom proposed by Bohr in 1913, the electron moves around the nucleus at a speed of  $2 \times 10^6$  m/s in a circular orbit of radius  $5 \times 10^{-11}$  m. What is the magnitude of the magnetic moment generated by the electron's motion?

**Solution:** From Eq. (5.69), the magnitude of the orbital magnetic moment of an electron is

$$|m_0| = \left| -\frac{1}{2}eur \right| = \frac{1}{2} \times 1.6 \times 10^{-19} \times 2 \times 10^6 \times 5 \times 10^{-11} = 8 \times 10^{-24} \quad (\text{A} \cdot \text{m}^2).$$

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