67. (a) The energy per unit volume associated with the magnetic field is

$$u_B = \frac{B^2}{2\mu_0} = \frac{1}{2\mu_0}\left(\frac{\mu_0 i}{2R}\right)^2 = \frac{\mu_0 i^2}{8R^2} = \frac{\left(4\pi \times 10^{-7}\,\mathrm{H/m}\right)(10\,\mathrm{A})^2}{8(2.5 \times 10^{-3}\,\mathrm{m}/2)^2} = 1.0\ \mathrm{J/m^3}\ .$$

(b) The electric energy density is

$$\begin{aligned} u_E &= \frac{1}{2}\varepsilon_0 E^2 = \frac{\epsilon_0}{2}(\rho J)^2 = \frac{\varepsilon_0}{2}\left(\frac{iR}{\ell}\right)^2 \\ &= \frac{1}{2}(8.85 \times 10^{-12}\,\mathrm{F/m})\left[(10\,\mathrm{A})(3.3\,\Omega/10^3\,\mathrm{m})\right]^2 \\ &= 4.8 \times 10^{-15}\ \mathrm{J/m^3}\ . \end{aligned}$$

Here we used $J = i/A$ and $R = \rho\ell/A$ to obtain $\rho J = iR/\ell$.