

15. The magnetization is the dipole moment per unit volume, so the dipole moment is given by $\mu = M\mathcal{V}$, where M is the magnetization and \mathcal{V} is the volume of the cylinder ($\mathcal{V} = \pi r^2 L$, where r is the radius of the cylinder and L is its length). Thus,

$$\mu = M\pi r^2 L = (5.30 \times 10^3 \text{ A/m})\pi(0.500 \times 10^{-2} \text{ m})^2(5.00 \times 10^{-2} \text{ m}) = 2.08 \times 10^{-2} \text{ J/T} .$$