1. Consider a toroidal coil with a rectangular cross section (inner radius a, outer radius b, and height h), which carries a total of N turns.

a. Calculate the energy stored in toroidal coil from the magnetic B-field.

b. Calculate the energy stored in the toroidal coil from $0.5LI^2$.

2. A fat wire, radius a, carries a constant current I, uniformly distributed over its cross section. A narrow gap in the wire, of width w<<a, forms a parallel-plate capacitor, as shown in the figure below. Find the magnetic field in the gap, at a distance s<a from the axis.
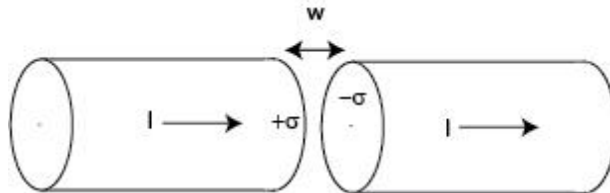
3. See water at frequency $n=4 \times 10^8$ Hz has permittivity $\varepsilon=81\varepsilon_0$, permeability $\mu=\mu_0$ and resistivity r=0.23 Ω.m. What is the ratio of the conduction current to displacement current?